THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

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JOURNAL OF GAS LIGHTING NEWSPAPER

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TO CORRESPONDENTS.

A Constant Reader's *letter is rather too pungent, but we may take an early opportunity of saying a word on the subject of the nuisance he complains of.*

NOTICES.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 12, 1858.

NOTES UPON PASSING EVENTS.

It is always mortifying to be obliged to acknowledge that we have been in error; but a frank and open avowal of having been deceived or mistaken must do infinitely more to raise the reputation of a man than any devices or contrivances, however ingenious they may be, for the purpose of turning attention from the error itself. Messrs. Simpson and Galton seem, however, to have failed in discovering this elementary principle of public conduct; and, so far at least as we can judge from the documents to which we have obtained access, they seem, in consequence of their short-sightedness, to have rendered their position with respect to the London Sewerage even more untenable than it ever was. There is some mystery about the recent transactions between the Metropolitan Board of Works and the Government Referees; but, as far as we can learn, Messrs. Simpson and Galton have lately had the indelicacy to present to the Board a new scheme for the Main Drainage of the Metropolis, together with some remarks in reply to the criticisms upon their original communications. Now this course of proceeding is so unprofessional, and so strange, that we hesitate to believe all that we hear on the subject; still a sufficient publicity has been given to Mr. Bidder's rather sharp rejoinder to the asserted propositions, to justify the public in supposing that the latter were nearly such as they were said to have been.

The presentation of a new scheme by the Government Referees, who, be it observed, had already presented no less than four separate projects for the Metropolitan Drainage, is, under any circumstances, a strange commentary upon their own conduct in advising Sir B. Hall to reject the scheme originally proposed by Mr. Bazalgette. They did so advise the rejection, distinctly upon the ground that they had studied the question sufficiently to warrant them in presenting a more perfect design of their own; and yet, before twelve months have expired from the date of the presentation of their report, they have submitted no less than four variations from their original proposal. It is easy, of course, to understand the uncertainty which every conscientious man must feel, the doubts and hesitations he must overcome, before he could arrive at any definite conclusions with respect to a question so complicated, so momentous, as the one connected with the drainage of London. No fault could, then, have been found with Messrs. Simpson and Galton had they at once candidly confessed that they hesitated in recommending any particular course. But they clearly were to blame in recommending Sir B. Hall to reject the matured plan of Mr. Bazalgette when they themselves were so manifestly working in the dark; and the Ratepayers of the Metropolis may at least congratulate themselves that they have escaped from a dangerous course of "tentative" Engineering under the auspices of the former advocate of Local Self-Government. The most extraordinary part of the business, however, is, that Messrs. Simpson and Galton should have thought fit to present a new scheme at the present day. The Metropolitan Board of Works is committed to a particular plan, and it has adopted a definite system for its future operations. To throw doubts upon the propriety of their plan and system, unless they had been invited to express a professional opinion, was, therefore, a gratuitously mischievous proceeding on the part of men who are still so manifestly unable to form a decided opinion of their own, that even when they adopted the unusual course they were so ill-advised as to adopt, they have been compelled to stultify all that they had previously done when officially employed in the matter.

It is to be feared that the mortified vanity, which it is to be suspected is at the bottom of this proceeding, will lead to much angry discussion, and to an unsatisfactory state of public opinion on a subject of vital importance to the Metropolis. Even Mr. Fairbairn, at the meeting of the British Association, uttered some opinions with respect to it which appear to have been borrowed from the last suggestions of Sir B. Hall's Referees; and he made use of the mischievous importance thrust upon him, by his position amongst the "peripatetic philosophers," to diffuse the hasty and incorrect views he had thus unfortunately espoused. Mr. Fairbairn and Sir B. Hall's Referees have lately adopted the notion that the whole of the sewerage should be passed to the northern side of the Thames, and thence through an outfall sewer to the German Ocean. As Mr. Bidder very truly remarks, Messrs. Simpson and Galton have themselves long since shown the hopeless absurdity of such a plan. They said "that the proposal to pump the whole of the sewerage on the south side is undesirable, because it entails great risk of floods, and an expense which would be considerable at the present time, and one likely to increase." But Mr. Fairbairn adds to the absurdity by advising that the Thames Tunnel should be used for passing the sewerage from the south to the north sides of the river; forgetting the level of the floor of the Tunnel, and the difficulties of carrying the outfall sewer from thence through, or under the Docks, and across the various canals and watercourses of that part of the town. How hard it would appear to be to prevent some men from meddling with things they know nothing about! how difficult it is to "stick to one's last!"

Dr. Strang's paper read before the "peripatetics" at Leeds, although liable to criticism on the score of its statistics, contains many very sensible remarks, which we must say that we were surprised to discover in any communication to the very equivocal body in question; because the manifest leaning of the President to the exploded fallacies of the Chadwickian school had led us to doubt whether any free expression of opinion in opposition to them would have been allowed. Dr. Strang said truly that there is a growing desire for an unlimited supply of good pure water; and with equal truth he stated that there was a necessity for limiting its consumption, or rather for controlling the reckless waste prevailing in far too many cases where the constant-supply system has been introduced. This is a principle which we have long endeavoured to impress upon the public; and it is, therefore, a source of satisfaction to us to witness its recognition by an independent authority, from whose opinions on matters of detail

we indeed differ. Water costs nearly as much as gas in some of our towns, and is really worth nearly as much. Why, then, should gas be sold by measure, and water be supplied without let or hindrance to people only too willing to waste and abuse it? Then, again, Dr. Strang has wisely discovered that the supply of water and the execution of a system of sewers are not all that is required by a community for the satisfactory sanitary condition of the locality it inhabits. There is as much need for a system of deodorization of the sewerage of a town as there is for its collection; and the neglect of the late General Board of Health to enforce this part of the duties of Local Boards must always remain a standing reproach to its advisers. Of late years the result of sewerage works has simply been to transfer the nuisance of cesspools to the natural outfalls, and everything which tends to recall attention to the subject thus so strangely neglected must be hailed with satisfaction. The words of the paper to which we are anxious to call attention, "that an abundant supply of water is, in short, a limited benefit, except provision be at the same time made for a perfect and profitable riddance of the increased sewerage which it invariably creates," are, in the main, true. It is unfortunate that the word profitable has been introduced; but there can be no doubt as to the necessity of a perfect riddance of the sewerage.

We say that it is unfortunate that the word *profitable* has been used, because the final extinction of the Leicester Patent Sewerage Manure Company, and the results of the experiments at Rugby and elsewhere, prove that, at present at least, no profit is to be made out of the "town guano," as the town refuse is affectedly called. The duty of communities in the matter is, however, in no wise modified by this view of the case. Whether the refuse they collect be or be not of value, they are equally bound to prevent its becoming a nuisance; and the pollution of the watercourses throughout the country, although often counselled by the late officers of the extinct General Board of Health, must always be considered a political and social offence of a very serious description. Nor can the Board of Health be considered blameless for the ruin and disappointment caused by the failure of the various schemes for profitably removing sewerage. The false statistics it published, the exaggerated opinions it promulgated as to the value of "town guano," must have lured on many to their undoing, as in the case of the unfortunate Leicester Company above mentioned. It is currently reported, and we believe that it is true, that the works at Leicester have entailed a loss of at least £50,000 on their spirited projectors. This is very sad; and most earnestly would we beg the town authorities to diminish the burthen to the unfortunate shareholders, who at least have solved the problem of rendering sewerage innocuous—if not profitable.

It appears that some other engineering doctrines or practices, recommended by the fashionable empirics who are again about to enlighten the world at Liverpool, have this year been sorely belied by the results of experience. Thus the pure waters collected at Rugby, in the style so inappropriately praised by Mr. Owen, have been so sadly deficient as to have caused great personal inconvenience to the inhabitants of the town. It is even said that much fever prevails at Rugby in consequence of the stoppage of the "self-cleansing pipes;" for those useful articles appear disposed to contradict the assertions of their patrons, and to become foul, just as ordinary "sewers of deposit" would, if they do not receive a full supply of water. There was a rumour also that the old Croydon epidemic had returned; but there are no ready means of ascertaining the real facts of these cases on account of the number of parties interested in distorting them. Official science disguises truth very successfully in many cases; unfortunately for itself, it cannot do so in all; and thus by degrees the failure of pot-piped gathering-grounds and self-cleansing drains becomes known.

There was another favourite dogma with the Sanitary Reformers Mr. Owen delights to honour, viz., that "hill-top waters" were superior to those obtained from valleys. Alas! for imagination, when brought into contact with the stern realities of this work-a-day world! The "hill-top water" supplies of most of our northern cities have this year failed sadly; and the scarcity of water, so loudly complained of at Berwick, has been felt as seriously at Dundee and at Edinburgh. The fact is, that the system of storing water for a town supply is always a hazardous one; and it should only be resorted to when every available natural resource has been exhausted. This is a truism. Unfortunately, the truisms of Hydraulic Engineering have been so mystified of late years by official science, that the bitter lessons of adversity appear to be required to bring back public confidence from its blind guides.

In spite of the efforts of the parties interested in deceiving the public as to the real scope and tendency of the Local Government Act, many towns have already very wisely declined availing themselves of the powers it is falsely asserted to confer. Thus at Lincoln and at Retford the inhabitants have distinctly rejected propositions for adopting the Act; and at Bury St. Edmunds the Clerk to the Paving Commissioners very properly observed that, in its present form, the Act could not possibly work. This is as it should be; and we congratulate the several towns thus named on the course they have adopted, for they may be sure that the practical working of the new Act will be even more unsatisfactory than the one it is supposed to supersede. It is humiliating, however, to find that Government after Government allows the best interests of the country thus to be trifled with by the incompetent, and, it is to be feared, the unprincipled parties who have thrown the municipal affairs of the country into such sad confusion.

Something, however, would appear to be required to be done at Lincoln to remedy the state of the river, which now constitutes, in fact, the natural outfall of the district. We said in our last number that it required a rude faith in the principle of Local Self-Government to hold by it after reading the discussions of the country municipalities; and really the conduct of the authorities of Lincoln in this matter has been such as to "point the moral" of the saying. There seems to be evidence—more than enough—to demonstrate the necessity for the adoption of vigorous measures to abate the nuisance from the miniature Thames of this town; but there seems equally to be a sad neglect of duty on the part of those who ought to feel themselves responsible for the health and comfort of their fellow-citizens. The old common law of the land provided a remedy for this state of things, and under its provisions the public nuisance of the river might have been dealt with effectually. Modern empirical legislation has, however, cast so much doubt and uncertainty over the whole subject, that it is now hard to say what is the law with respect to the fouling of a watercourse; and the sufferers from the state of the Witham must, we fear, wait, with all the patience they can, until it shall please the Legislature to devise a rational system of sanitary legislation. In the meantime the mortality of Lincoln has increased from about 21·5 per 1000 in 1852 to about 25 per 1000 in 1857. Surely these figures ought to induce the Town Council to set their houses in order; for the year 1857 was by no means a generally unhealthy year, although in low marsh districts it certainly was accompanied by a very unsatisfactory state of the public health. Of course, in making these remarks, it must be understood that we by no means approve the ungenerous attempt made by some members of the Lincoln Town Council to throw their own responsibility upon the Water Company, and to shift the blame of those who were answerable for the bad state of the river upon the parties who were to provide means for flushing the drains. There has been, we fear, some passion, and much narrow-mindedness, in the manner of treating this question hitherto. Let us hope that the actual facts of the case will induce greater care, and more liberality, in the guardians of both the public health and of the public purse in this town.

There are several curious phenomena to be observed just at present in the state of public health, to which the attention of medical practitioners might well be directed. The first is, of course, the occurrence of the low fevers which so sadly afflict places like Lincoln and Rugby, where either no drainage exists, or where it has been badly executed; the second is the strange frequency of diptheria in some parts of London, as at Notting Hill, for instance; and the third is the prevalence of goître in parts of the west of England. It is only within a very short period that the last-named disease has been officially recognized as one of our national or local misfortunes; but it is to be feared that many cases of it occur, and that this foul disease slays many unrecorded victims.

It appears also from the public prints that within a very short period a Report will be issued by the officers appointed by the Admiralty to inquire into the relative values of the Welsh and of the North country coals for steam purposes. From what has hitherto transpired on the subject, there is little reason to doubt the point blank reversal of the opinion expressed by the Commission of the Museum of Economic

Geology of 1848. At the latter period it was virtually said that the Welsh coals evaporated more water and occupied less space, weight for weight, than the North country coals did. Now, the Admiralty officers have discovered that the facts of the case are precisely opposite to those stated by the costly original Commission, and that the investigations of Messrs. Longridge, Armstrong, and Richardson were infinitely more valuable than those for which the country paid so large a sum of money. This tale is a sad pendant to the results of the Royal Commission for inquiring into the building stone to be used for the Houses of Parliament; but who is responsible for the loss thus entailed upon the nation? Truly, it seems that the bitter words we lately used—namely, that the first condition to being employed by our Government in scientific matters was to know nothing at all about them—are literally true; and yet many worthy people call for Governmental patronage of Science and Art!

There has lately occurred in France a trial to which it may be desirable to call the attention of our capitalists at this particular moment, when there seems to be a possibility of a revival of speculation. In the case we refer to, Mr. Brett, the *gérant* of a Company for working the Telegraph to Algeria, has brought forward a claim against Messrs. Newall, Liddell, and Gordon, on account of the loss he has sustained through the defects in the cable, which have been such as to induce the French Government to decline paying the guaranteed rent upon the capital of the Company. Now, it is very possible that the cable may be useless at present, and that therefore the French Government is perfectly justified in so refusing to pay the rent. We do not pretend to know anything of the merits of the case, but certainly we think that it is worth while to dwell upon the very unsatisfactory nature of foreign guarantees, especially of those given by foreign Governments. How are they to be enforced?

MONTREAL WATER-WORKS.

Perhaps when electrical telegraphs shall have worked for years, and Galway packets shall have brought the Western World within easily accessible distance of our shores, we (in England) may become more learned in the doings of the noble offshoots of the Anglo-Norman race in those regions than we hitherto have been. This was the first reflection made by our unworthy editorial selves on reading the Report of the Water Committee of Montreal for the year 1854; and the second reflection we made was, that it was sad to find that so much intellectual activity, so much public and private energy should be employed in a mere province, without its histories penetrating beyond the narrow boundary of the local journals, or of the local public bodies directly interested in the results of the experiment thus tried. Some rather warm discussions appear, moreover, to have taken place with respect to the Montreal Water-Works; and it may, therefore, happen that, although the following notice may be considerably "behind time," it may call attention to questions of Political Economy and of Hydraulic Engineering of a general and universal nature. Perhaps, also, it may induce some of our readers to communicate to us more opportunely information with respect to the sayings and doings of remote localities. Indeed, as the objects we propose to ourselves, in conducting this Journal, are to defend the interests of private enterprise, and to advance to the utmost of our ability the scientific and technical knowledge of the Engineering Profession, we appeal with confidence to our readers for the assistance and support thus alluded to.

However, to return to the consideration of the Montreal Water-Works, it appears that for many years the inhabitants of the town were content to leave the supply of this particular municipal want to the enterprise of private individuals, but that about 1843 they were foolish enough to allow the Corporation to take upon itself the discharge of a function which, we contend, is always, in the end, performed in a better and more satisfactory manner by private traders. Originally, the water distributed in the town was derived from springs rising in the neighbouring hills; but about 1816 those springs were abandoned, and the water was subsequently raised from the St. Lawrence in the district below Point St. Charles. About 1852 it was found that neither in quantity, nor in quality, was the existing establishment adequate to the supply of the 60,000 inhabitants of Montreal, and the Corporation decided to construct entirely new works. For this purpose they engaged the services of Mr. Keefer, a local engineer of considerable eminence, who had been engaged on the Welland Canal, the Montreal and Kingston Railway, &c.; and under his advice the present water-works have, as far as we learn, been entirely executed.

Mr. Keefer very wisely has established his point of supply at a position in the upper part of the river, where the town sewerage can hardly by any possibility affect the quality of the water; and, as far as the published documents allow us to judge, at a point where the waters of the St. Lawrence are of a very wholesome and satisfactory nature. The supply-head is situated at about 6½ miles above, or to the S.S.W. of the site of the proposed bridge of the Grand Trunk Railway, and is immediately above the Lachine Rapids. Mr. Keefer has here established an open channel, 20 feet wide at the bottom, and 40 feet wide on the water-line, with a depth of water of 8 feet, and a fall of 2½ inches in the mile. The channel follows a more direct course than the river; and, after being carried a distance of about 4¾ miles, it arrives at the engine-house situated near the Lachine Canal, near Gregory's, and close to the little river St. Pierre, which was originally intended to receive the tail-waters of the mill. The water is raised from thence by means of two breast-wheels, entirely of iron, made by Mr. Wm. Fairbairn, of Manchester. These wheels are 20 feet in diameter, and have a length of bucket of not less than 22 feet; the buckets, it may be added, are Fairbairn's ventilating buckets. The wheels receive the water with a 16-feet fall, and the power is all taken off on the inside periphery near the load. The pumps are three-throw plunger pumps, and are provided with an efficient air-vessel; they force the water directly through a 30-inch rising-main into a new reservoir, constructed on the Côte au Baron, at an elevation of 200 feet above the water in Montreal Harbour. The estimated cost of these works, which were designed to supply 5,000,000 gallons per day, was £150,000; and, as the former establishment for pumping from the St. Lawrence, together with the distributory apparatus, had cost the Corporation about £80,000, the total capital embarked in the Water-Works of Montreal must be considered to be very large indeed. It was, in fact, in 1854, in about the proportion of £5. 10s. per head of the total population.

This economical result is far from satisfactory; and it is not surprising, therefore, that the wisdom of the course adopted by Mr. Keefer should have been seriously questioned. So far as Montreal itself is concerned, it is now too late to discuss the proper mode of dealing with that town, for the outlay has been incurred, and the Corporation must abide by their own acts: other towns, however, may profit by the lesson thus afforded. Now, it seems to us, judging solely from the papers issued by Mr. Keefer himself, that the proper course at Montreal would have been to have led the water from the present source of supply, above the Lachine Rapids, by means of a cast-iron pipe, to a steam pumping-engine in or near the town; for the cost of making the open channel has been so enormous, as entirely to annihilate the economy in the working of the water-wheels. The calculations on which Mr. Keefer evidently relies the most, as a justification of the system of pumping he adopted, were those made by Mr. W. J. M'Alpine, of Albany (at pages 75 and 76 of the Report); for the comparative statement Mr. Keefer gives of the cost of raising water by the wheels at Philadelphia, and by the old engines at Montreal (page 55), is so manifestly illusory, that we are at a loss to account for its insertion in any document issued by a man so evidently acquainted with his profession as Mr. Keefer has proved himself to be. In these calculations Mr. M'Alpine is, however, obliged to resort to what appears to us a singular piece of disingenuousness, in order to show an advantage in the use of water-wheels over steam pumping-engines, for he calculates upon a lift of 200 feet for the former, and only of 160 feet for the latter; yet, even on this supposition, he makes the cost of raising every 1000 gallons by steam 1½ cents, and that of raising the same quantity by water power 1¼ cents. Properly speaking, the calculations should have been made for the same lifts; but, in addition to this radical error, it must be observed that Mr. M'Alpine reckons the duty of 1 lb. of coal only at 420,000 lbs. raised 1 foot high, even though he himself, a few lines further on, states that the best descriptions of Cornish Engines perform a duty equivalent to 1,000,000 lbs. raised 1 foot high.

The fact is that the American Engineers, with all their undoubted skill and ingenuity, are not so well acquainted with the construction of machinery intended to work economically, and for long periods of time, as their brethren on this side of the

Atlantic. To us it appears, also, that the Corporation of Montreal made a serious mistake in not seeking the advice of an English Hydraulic Engineer upon the great work they were about to undertake, as well as the advice of the eminent States Engineers they did employ. It is ridiculous to apply the Munroe doctrine in engineering matters; and most unhesitatingly do we assert that Mr. Wicksteed's criticisms on Mr. Keefer's plans merited far more attention than they seem to have received. The result of the system of not seeking the aid of extensive and varied foreign experience, in this Montreal case, has thus been to entail upon the town a very heavy burthen. Had a private company committed such a blunder, it would have been obliged to support the consequences of its own acts: as it is, all the inhabitants of Montreal, whether members of or voters for, or merely subjects to, the Corporation, are liable to a heavy charge in a matter which is practically beyond their own control. Such cases as these prove the danger of the direct intervention of the general body of society in matters strictly falling within the province of trade; and as we in England are rather disposed to copy the mistakes of other nations —in these matters at least—we should do wisely to ponder over the results of the Montreal Water-Works. The works at Boston and New York, rightly examined, would, we think, read the same lesson as to the folly of any corporation turning trader.

Circular to Gas Companies.

In another part of our columns will be found a long letter from Mr. Hills complaining of the unfair tenour of our articles upon the recent trial *Hills v. the London Gas Company*, and containing an ingenious, if not an ingenuous, defence of his own position. Now, Mr. Hills must know perfectly well that, in our capacity as public journalists, it is our province to give expression, and sometimes to give very strong expression, to our opinions upon the passing events of the day. In reference to this trial, however, we abstained, to a great extent, from any expression of opinion, and confined ourselves principally to an analysis of the points of the case, and of the evidence bearing upon them. Our articles were, in fact, mere elaborations, and in many parts even paraphrases of the judge's summing up. The report of the trial occupied sixty-four of our columns, and as many of our readers would probably object to wade through such a mass of evidence and argument, we gave what we conceived, and still conceive, to be a clear and fair abstract of the whole case. It was no fault of ours that the evidence bore hardly on Mr. Hills, and he ought not to upbraid us on account of a circumstance for which we are in no way responsible. Had we misrepresented the evidence, Mr. Hills might reasonably have complained; but surely we are not to blame, even if the defendants did rely upon what Mr. Hills is pleased to call "staggering propositions" and "barefaced mystifications."

Mr. Hills virtually alleged that the London Gas Company was endeavouring to cheat him out of his just rights; and the London Gas Company virtually alleged that Mr. Hills was endeavouring to cheat them out of royalties to which he had no title whatever. We gave the allegations on both sides, and the evidence by which each was supported. The propositions that Mr. Hills had patented the crudest notions of his brain, that he was a man eager to patent anything, &c. &c., are not our allegations, but those of the London Gas Company. If, however, any one is anxious to know on what grounds such statements rest, we have no hesitation in referring him to Mr. Bovill's cross-examination of Mr. Hills himself.

Now, it is no part of our province to undertake the defence of the London Gas Company's position in this case, or to refute the *ex parte* statements and reasonings contained in Mr. Hills' letter. We will, however, try to give Mr. Hills an explanation of one or two points on which he really seems to be altogether mistaken. In the first place, our statement in reference to the sympathies of the jury simply amounted to this, that in cases where an individual is opposed to a powerful corporate body, a dozen well-disposed men naturally feel kindly towards the individual, and with every intention to act uprightly, frequently allow their judgments to be warped by their sympathies. This has happened to a notorious extent in State trials, and we still think it was not without its influence on the verdict of the Guildford jury, despite the warning received from Baron Bramwell, to whom this tendency of juries was evidently well known.

With regard to Mr. Hills' patent, it obviously contains two distinct claims; and although he, indeed, may have intended them to be taken, not separately, but conjointly, as constituting one invention, the law, as explained by Mr. Bovill, corroborated by Baron Bramwell, and undisputed by the Attorney-General, says otherwise. Each claim must stand on its own merits, and if one claim fails, the whole fails. The London Gas Company alleged that Mr. Hills' claim to the discovery of the use of hydrated oxide of iron for removing sulphuretted hydrogen from coal gas was not new, and they brought forward evidence to prove prior publication. They cited Mr. Croll's patent, Mr. Croll's actual practice, and Mr. Laming's patent, *quoad* both the so-called carbonate of iron, and the mixture of oxide of iron and chloride of calcium. We gave an abstract of this evidence in our previous articles, and noticed the objections that were taken to it. Of course Mr. Hills would not bring forward evidence to prove a negative; he could simply rebut that which was adduced on the other side, and therefore we had no direct evidence of his to consider upon this point. Altogether it seemed to us, and still seems, that, so far as relates to the mere use of hydrated oxide of iron, Mr. Hills has not the shadow of a claim. On this subject we would direct our readers' attention, not to Mr. Hills' letter, which is *ex parte*, nor yet to our abstract of the evidence, which he considers unfair, but to the report of the trial itself, and particularly to Baron Bramwell's summing up.

It pleases Mr. Hills to say that Mr. Croll's patent was for anhydrous oxides only, that Mr. Laming used only anhydrous oxide with his chloride of calcium, and that the substance Mr. Laming called carbonate of iron differed altogether from that which Mr. Hills called hydrated oxide of iron. We cannot again enter upon the discussion of these statements; we can only say that they are not supported by evidence. Thus it being known to chemists that hydrated oxide of iron would absorb sulphuretted hydrogen, and it being thought that the anhydrous oxides would not, Dr. Miller, one of the principal witnesses for the plaintiff, said that the term "oxides," used by Mr. Croll, would include both varieties, and that with his knowledge of the subject, reading Mr. Croll's specification, he should have taken the hydrated, and not the anhydrous oxide; and it subsequently turned out, from Mr. Croll's own evidence, that the substance he actually did use was the hydrated oxide, prepared by one of the processes prescribed by Mr. Hills, and still used by his lincensees, Messrs. Owen and Mertens. It appears to us that Mr. Croll claimed the use of all varieties of oxides of iron, those which were suitable and those which were not. If Mr. Hills had contrived to point out and claim only those oxides which were suitable, Mr. Croll's prior but general claim would probably not affect him. But in reality he advanced the matter very little further than Mr. Croll, for he claimed the use of all hydrated oxides, some of which will not answer, and he excluded all anhydrous oxides, some of which will answer excellently; suitability being a question not of hydration at all, but rather of molecular condition.

We will take the liberty also of correcting Mr. Hills on a point of chemical history. The circumstance that, by exposure to air, chalk as well as lime will decompose muriate of iron, in the moist way, and at ordinary temperatures, so as to produce hydrated oxide of iron, is no recent discovery of Mr. Laming's, but has been a well-known chemical fact for more than half a century. Chalk will certainly suffice to decompose the salts of iron, though it may not suffice for the salts of zinc and manganese. For our own parts, we do not perceive that Mr. Laming's specification even suggests that his mixture of chloride of calcium and oxide of iron is to be made at a red heat, so as to contain only the anhydrous oxide; and we would remind Mr. Hills that the mixture actually used by Mr. Laming was certainly made in the moist way, and contained only the hydrated oxide. The proposition announced in Mr. Hills' letter, that nothing is to be inferred in a specification that is not necessarily pointed out, cuts several ways. It would affect Mr. Hills' own patent, and it would certainly prevent our conceiving Mr. Laming to have indicated the use of a red heat in the production of his chloride-of-calcium mixture, when the specification does not say one word about it.

In reference to Mr. Hills' claim to be the discoverer of the process of revivification, we explained at starting that the evidence was contradictory. We then referred to certain documents, which showed indisputably that the process of revivification was known to Messrs. Laming and Evans prior to the date of Mr. Hills' patent. We can assure Mr. Hills that the

description given in Mr. Laming's objection-paper, as read by Mr. Newton before the Attorney-General in September, 1848, is an exact description of what takes place in working his own patent. There is always a certain small quantity of sulphate of iron formed in addition to the peroxide. Mr. Laming wrote, "For this purpose I simply expose to the air the sulphuret of iron which results from the purification of illuminating gas by hydrated peroxide of iron. This exposure causes it to change back again, chiefly into peroxide of iron, and partly into sulphate of iron." It is suggestive to contrast this description with Mr. Hills' original claim in his deposit-paper of November, 1849:—"For absorbing sulphuretted hydrogen and other gases into porous bodies, and renovating them again by heat, &c., or taking off atmospheric pressure." Whether the documents above referred to, and the experiments they described, constituted publication, we left entirely to the judgment of our readers. We then gave an abstract of the principal evidence adduced by Mr. Hills, namely, his own, that of his brother, that of Mr. Barnard, that of Mr. Dale, and that of Mr. Wonfor; together with the objections urged against this evidence by the defendants. We then gave an abstract of the principal evidence adduced by the defendants, namely, that of Mr. L. Thompson, that of Mr. Evans, and that of the work-people; together with the objections which Mr. Hills urged against it; and we are really unable to conceive how Mr. Hills can find fault with our summary of this part of the case.

Whether or not it is true that "Mr. Thomas Hills was frequently at the gas-works for days together; that the operation he was conducting did not require his constant attention; that the purifiers with which Mr. Laming was experimenting were close to, and within sight of, the scrubber with which the Messrs. Hills were experimenting; that the same workmen who assisted Laming assisted Hills," &c. &c., we, of course, cannot say; but we affirm most positively that evidence was given to that effect, not only by Mr. Evans, but by the workmen Gibbs and M'Guire, who were not cross-examined. Even Mr. Thomas Hills himself, speaking of the plaintiff's experiment at the Westminster Gas-Works, says: "It was finally set to work on the 28th of July. I visited the premises only three or four times after that, the last time being about the latter end of August. . . . . I saw Mr. Laming there one day, and Mr. Evans told me he was going to use Laming's patent, or had done so. . . . . I might have been at the works as late as October."

A few words in reference to the changes in chemical nomenclature, upon which Mr. Hills is so facetious. These changes, though much to be deplored, cannot be ignored, or even prevented. They are necessary consequences of our progressive knowledge of the absolute and relative composition of bodies. We think we may venture to retort upon Mr. Hills the charge of mystification concerning those changes, for they are really very simple. Thus, for instance, the word potash, or pot-ashes, was originally applied to the substance obtained from the ashes of plants burnt in iron pots. This substance is now known to be a carbonate of the oxide of potassium. By the action of lime upon this substance, there was subsequently prepared a more acrid substance, which is now known to be the hydrate of the oxide of potassium. This substance was also called potash, and in distinguishing between the two, the former was designated mild potash and the latter caustic potash. Lastly, by means of metallic potassium, there can be produced a third substance, also called potash, which is simply an oxide of potassium, and to this substance only is the name potash scientifically appropriate. In a similar manner the word soda has been applied successively to three different substances, namely, to the carbonate of the oxide of sodium, to the hydrate of the oxide of sodium, and to the pure or simple oxide of sodium, to which last substance only does the name properly apply.

Now, when Mr. Hills in his specification prescribed the decomposition of a salt of iron by potash or by soda, he certainly did not mean the oxides of potassium or sodium, which are only to be obtained from their respective metals, and which are the rightful possessors of the names in question, but he meant either the hydrates or the carbonates. It suits his purpose to say that he meant the hydrates; it suits the London Gas Company's purpose to say that he meant the carbonates. Who is to decide? His own witness, Dr. Miller, said under cross-examination that "caustic" (*i. e.*, hydrate) "soda would be more expensive than carbonate, and would produce a different result. . . . . Commercially, it would be a disadvantage to use caustic soda; and if this patent were put into my hand for the purpose of producing a hydrated oxide of iron, I should use the cheapest material." And then, in reply to Mr. Bovill's question, "And looking at the word 'soda' here, you would use carbonate?" the witness replied, "Yes, if you like." Dr. Odling, a witness for the gas company, also said—"The term 'soda' in the specification I should, with my knowledge of the subject, read as carbonate of soda;" and he was supported by Messrs. Warrington, Redwood, Herapath, and Dr. Richardson. It is observable that Mr. Hills, when referring elsewhere to hydrate of soda, speaks of it under its distinctive name, "caustic soda."

In a somewhat similar manner the phrase carbonate of iron has been employed to designate two different artificial substances: a well known permanent substance, to which the name has been most generally applied, and a comparatively rare and unstable substance, to which the name is most properly applied. When Mr. Laming spoke of carbonate of iron, which of these substances did he mean? The London Gas Company say the first, and Mr. Hills says the second. In our opinion, the view of the London Gas Company was satisfactorily sustained; but having considered this point fully in one of our previous articles, we have no intention of resuming the discussion. We would suggest to Mr. Hills, however, that the carbonate of iron of the English *Pharmacopœias* and *Dispensatories*, or the *ferri carbonas* of the Latin *Pharmacopœia*, or the hydrated peroxide of iron of modern chemists, was sold at a high price because it was used only in small quantities, and was required in a state of great purity, but that a commercial article produced on a great scale would have a different price altogether. Indeed, the process of the *Pharmacopœia* is either identical with, or cheaper than, one of the processes described by Mr. Hills, according to whether the word soda means the carbonate or the hydrate.

Lastly, with regard to gas liquor. This substance consists principally of carbonate of ammonia and hydro-sulphuret of ammonia in a state of mixture. Mr. Laming claims the use of a substance precipitated from muriate of iron by gas liquor, from which the hydro-sulphuret has, or has not, been removed. In the first case, he would get a carbonate of iron; in the second, a mixture of the carbonate and hydro-sulphuret of iron; and both the simple and the mixed carbonate of iron would be converted into hydrated peroxide by exposure to air. Mr. Hills claims the use of a substance precipitated from muriate of iron by hydro-sulphuret of ammonia. The London Gas Company alleged, and brought forward some evidence to show, not that hydro-sulphuret of ammonia would produce carbonate of iron—this is a slight mystification of Mr. Hills'—but that gas liquor was the only form of hydro-sulphuret of ammonia that Mr. Hills could use under his patent; that it was a form he was at one time desirous of using; that it was a form he occasionally did use; and, consequently, that the substance claimed under his patent of 1849 was identical with the substance claimed by Mr. Laming under his patent of 1847.

We regret the necessity which Mr. Hills' communication imposes upon us of expressing a more decided opinion upon the merits of this case pending the appeal to the higher tribunal at Westminster, but, being thus challenged, we are reluctantly compelled again to return to the subject, and in so doing have endeavoured to mete out equal justice to all the parties.

The wordy warfare now raging in Manchester with respect to the abuses alleged to be practised by means of high-spouted meters, has received a fresh impulse from the publication of an address to the corporation of that city by Mr. Crosley, in vindication of himself from the charges brought against him by the gas committee, of improper interference with their administrative functions. This document gives a greater insight into the interior management of the Manchester Gas-Works than has been hitherto afforded to the public eye, and presents an unfavourable contrast with that of similar undertakings when carried on by private enterprise, controlled as such are by the possibility of competition. Under somewhat similar circumstances the Lancaster Gas Company unhesitatingly pledged themselves to abandon the use of high-spouted meters, upon their liability to be overfilled being pointed out to them. The manager of the Manchester Gas-Works, on the contrary, is represented to have avowed his intention of recommending their use, even though the gas committee might have decided the reverse; and as the assertion has remained for several months without being publicly contradicted, we assume its accuracy is not questioned. The gravity of this avowal is en-

hanced by the allegation that at the moment the avowal was made the remuneration of the person making it depended on a per centage on the amount of gas sold, in which case he would have a direct interest in exaggerating the quantity indicated by the meter indices; and certainly no more appropriate instrument for such a purpose could be designed than a high-spouted meter of the construction to which he seems pertinaciously to adhere. Mr. Edge, and probably other makers, have for years past manufactured excellent instruments which are not liable to these objections, and we have good grounds for believing that Mr. Wright would have made none others, had he followed the unfettered dictates of his own clear-headed judgment. It is, therefore, puerile to say that high-spouted meters are a necessity; and we apprehend we can render no greater service to gas companies than in pointing out one of the chief sources of the disputes in which they are often involved with their customers. The question is not whether this meter or that indicates most correctly, when adjusted to the true water-line, the quantity of gas consumed, but whether a system shall be tolerated which, either by the ignorance of the gas consumer or by collusion between the officers of the gas manufacturer, shall incorrectly register the quantity of gas supplied; and we would advise engineers and other inhabitants of glass-houses to reflect well before they lend the weight and influence of their names to sustain such a system. It is not within our province to interfere in the squabbles of rival patentees or competing manufacturers, but when a great public question is raised, in which the integrity and fair dealing of a large body are concerned, we should be wanting in our duties were we to refrain from grappling with it, through any undue affection for private interests, or for old associations.

Correspondence.

HILLS *VERSUS* THE LONDON GAS COMPANY.

Sir,—In the numbers of your Journal for August 31 and September 14, articles have appeared on my late action against the London Gas Company, which, in combination with other companies, has attempted to resist my patent for the use of hydrated oxides of iron for purifying gas. I have to complain of the very one-sided account that is given in those articles of the evidence given at the trial, and if I allowed it to pass unnoticed it might be inferred that I admitted their correctness and fairness, which I certainly do not; and I have, therefore, to request that you will in your next number be good enough to insert this letter, in which I will endeavour to show the facts of the case as they really are, and the fallacy of the objections and arguments brought forward against my patent.

The best way, perhaps, to do this will be to take the more prominent arguments and statements as they occur in the said articles, and which are mostly the same as those used by the defendants at the late trial, only they are generally rather more exaggerated, and, therefore, in showing the futility of the one I show the futility of both. And, first, it is stated that the jury decided the case rather by their sympathies than by the evidence given, which is tantamount to saying they gave a verdict contrary to their judgment out of sympathy to a person who they had probably never heard of before, although they had sworn to give their verdict according to the evidence, and which we shall see that they most certainly did. At the outset I will state what my patent is for. It is "for a method of purifying gas by passing it through *hydrated or precipitated* oxides of iron, either mixed or unmixed with sawdust and certain other things, and of renovating the material when it becomes inert." The following appear to be the principal points relied on to try to upset this patent for the use of *hydrated oxides* of iron:—First, a patent of Mr. Croll's, nearly twenty years old, and never used for anhydrous oxides. Second, a patent of Mr. Laming's, in 1847, for chloride of calcium, with which certain oxides are mixed, but which oxides are evidently anhydrous; and no mention is made of hydrated oxides at all. Third, another part of this same patent for the use of carbonates of manganese, iron, zinc, and lead. Fourth, half-a-dozen experiments of Messrs. Evans and Laming at Westminster on mixtures of chloride of calcium and oxide of iron, and which I totally disclaim the use of. I will now shortly examine these several points. First, Mr. Croll's patent. This patent is not for the use of *hydrated* oxides of iron and renovating them by simple exposure to the air; so far from this, it is, as far as any oxides are concerned, for the use of anhydrous oxides of manganese which have been roasted for hours at a red heat. Oxides of iron, not hydrated oxides, are only mentioned incidentally with oxides of zinc, which do not purify gas beneficially, by stating that they may be used in the same manner as directed for manganese; and if oxides of iron were treated as directed for manganese, *hydrated* oxides would not be formed, and which the defendants were, of course, obliged to admit. How, then, is it pretended that this patent for anhydrous oxides can vitiate a patent for hydrated oxides which act so differently? Why, by stating that Croll says *oxides* of iron may be used instead of manganese, and the term *oxides* would include hydrated as well as anhydrous. This is, no doubt, ingenious and specious, but it is unsound and untenable; for Mr. Croll directs that the oxides are to be prepared by roasting them at a red heat for hours, and which would produce not hydrated, but anhydrous oxides. His claim shows clearly that hydrated oxides are not intended. It is this: "I claim the purification of gas from sulphuretted hydrogen by means of the oxide of manganese, the oxides of iron, and the oxide of zinc, *as hereinbefore mentioned and hereinbefore described, and not otherwise.*" Now, as the manner hereinbefore mentioned and described of roasting oxides would produce them in the anhydrous state, and they are only claimed when thus treated and not otherwise, how can there be any publication of the use of hydrated oxides? Clearly there is none. But it is said Mr. Croll *might* have used hydrated oxides to begin with, although he used anhydrous afterwards. We have nothing to do with what he might have done, but only with what he has published that he absolutely did or directed the public to do: to affect my patent he must have clearly and unmistakably have described the use of oxides in the hydrated state, and have shown clearly that they were hydrated; but this he has not done, but on the contrary, he shows that all the oxides, first and last, are anhydrous; for he says that after the roasting, and consequently after the oxides are become anhydrous, they are *fit again* to be employed by being placed in the purifier, moistened with water as in the first instance. Surely if the phrase "fit again" means anything, it means that the oxides are the same at first as at last, and as they are anhydrous at last, and are then *fit again*, they must have been anhydrous at first also. Such language as this could not be understood to mean that a different oxide was to be used at first to that which is used afterwards; a different oxide might be fit, but could not be said to be *fit again*, as the term again implies that it must have been the same before. There is, therefore, no publication or indication of any hydrated oxides of iron in this most unworkable and useless process of burning off sulphur from the oxides of manganese, iron, or zinc after *every time* they have been used as a purifying material. What pretence can there be that this is a prior use of hydrated oxides and their renovation by simple exposure to the air? As to Mr. Croll's private experiments before his patent, and which resulted in his specifying anhydrous oxides, they were unknown to anybody; he never mentioned them to anybody; and if he ever did purify by oxides of iron, it was known to nobody but himself, and except for this trial would never have been heard of. They were, of course, no publication of anything, and could in no way affect my patent.

We next come to Mr. Laming's patent of 1847. The specification of this patent is twisted and turned in the most extraordinary way to try to find in it a prior publication of my patent. And, first, it is said that hydrated oxides of iron would be made by the method described in this specification for making chloride of calcium; and, secondly, that by the use of the term carbonates Laming means oxides. I will now show that this is not the case. First, there is no mention made of hydrated oxides in this clause, which, of course, there must have been if their being in the hydrated form had been considered necessary. There are no directions given that will *necessarily* produce hydrated oxides; and if they are not necessarily produced by the directions given, there can be no publication of their use. If, by following the directions given, hydrated oxides may or may not be produced, then it is quite clear that they are not necessarily indicated, and might never be produced; and if they might never be produced by following the directions given, then it is quite clear again that there can be no publication of them. To be a publication, they must necessarily be produced by following the directions given; but this clause, which is for preparing chloride of calcium for purifying gas from ammonia, contains no such directions. It is as follows: "Chloride of calcium is both abundant and cheap; under certain circumstances it may, however, be desirable to make it, for the purposes of gas-purifying, by decomposing muriate of manganese, iron, or zinc, by means of lime, or of chalk when the latter will suffice. In such cases, the oxides or carbonates which result are useful for the purification, and need not be removed." This is the clause in which it is pretended that a prior publication for the use of hydrated peroxides of iron, and renovating them by exposing them to the air is published. The chloride of calcium is only to be used once to take up ammonia, so that there is no pretence for renovation; and we shall now see that, by following the literal and common-sense directions of the specification, any oxide produced would be anhydrous and not hydrated.

The directions given are, that to obtain the chloride of calcium wanted, muriate of manganese, iron, or zinc are to be decomposed by lime, or *by chalk when the latter will suffice*. Now, chalk will always suffice to decompose these muriates which are protomuriates, there being no per-muriates of manganese and zinc, and they are all classed together. Chalk is far cheaper than lime, and therefore, if the directions given to use chalk whenever it will suffice are followed, chalk would always be used. To decompose these muriates with chalk, all that is wanted is that the decomposition be effected in a reverberatory furnace or oven at a red heat, and the result of the decomposition will be chloride of calcium (to obtain which article the decomposition is made), mixed with *anhydrous oxides* of manganese, iron, or zinc. It was as-

serted at the trial that Mr. Laming had lately discovered a mode by which chalk would decompose the proto-muriate of iron without a high heat; namely, by spreading the mixture on the floor in contact with air. But this is not the fact, for by following such a process the proto-muriate of iron would by the action of the air become per-muriate, which is a different material to that indicated in the specification. But if Mr. Laming had recently discovered a way to decompose the proto-muriates without a red heat, it would not affect his specification, as the plan was not known at the time he made it. But chalk will not decompose the muriates mentioned by Mr. Laming for making his chloride of calcium, except at a high heat, and which, in the absence of any directions to the contrary, would infallibly make anhydrous oxides mixed with the chloride. Now, although chalk will thus always decompose the said muriates, and the directions are to use it whenever it will suffice, yet as this would produce the chloride mixed with *anhydrous* oxide, it does not suit the defendants; and so they say that Laming says that lime may be used instead of chalk to decompose the muriates. Well, suppose it is—why should not the decomposition be effected in the same way as when chalk is used, and to which a preference seems to be given, as we are directed to use it whenever it will answer—what is to give any idea that the decomposition by lime is not to be effected in the same way as when chalk is used? There is nothing; but on the contrary, it is the only plan of decomposing the muriates which agrees with the rest of the specification, and it is an easy and cheap way of effecting the decomposition; and *anhydrous oxides*, which in another part of the specification are said to be preferred, would, in the case of the lime as well as of the chalk, be produced. Thus we see that whether chalk or lime be used, no hydrated oxides would necessarily be produced, and consequently there can be no publication of them. To procure hydrated oxides at all by decomposing these muriates with lime, the decomposition must be performed in the wet way and not in a furnace; but this would be contrary to the whole tenour of the specification, which states that the oxide preferred is the oxide of manganese (not iron), made by exposing it to a heat near to redness for an hour or two, until its carbonic acid is expelled. This Mr. Campbell and Dr. Odling both proved would be anhydrous. At another part of the specification we are told how to make the oxide of lead and the oxide of zinc for purifying gas—namely, by exposing them for an hour or two at a low *red heat* in a furnace which would make them anhydrous. Thus we see that all the oxides Laming mentions for purifying gas are anhydrous—that by decomposing his muriates with chalk, any oxides obtained would be necessarily anhydrous—and therefore there is no reason to suppose that if lime were used instead of chalk any other than anhydrous oxides would be obtained; and although it is possible to get hydrated oxides mixed with the chloride of calcium if the muriates are decomposed by lime in the wet way, yet there are no directions given to do so; and as, to get them in the hydrated state, would be against the whole tenour of the specification, there can be no publication of their use, for, as stated before, if they are not necessarily produced by the directions given, there can be no publication of them. But even if hydrated oxides were published in this specification, they would be in a mixture with chloride of calcium, which I consider a useless mixture for purifying gas, and I have disclaimed the use of oxide of iron mixed with chloride of calcium.

We next come to Mr. Laming's carbonates: and, certainly, that there should be a serious attempt to make out that Laming when he says he means one thing, he really means another, is most incredible. They admit that he is a chemist, and yet say that when he says he means carbonates, he means oxides. Why not oxides, or why not chlorides or nitrates? or why not sugar, or starch, or anything else? If he does not mean what he says, who in the world is to know what he does mean?

This is the clause: "Another part of my invention consists in the use of the *carbonates* of manganese, iron, zinc, and lead for purifying gas." Now, it is found that one of these carbonates, namely, the carbonate of iron, will, by exposure to the air for a sufficient length of time, part with its carbonic acid and absorb oxygen and become an oxide; but it is only the carbonate of iron that will do this. The other carbonates of manganese, zinc, and lead remain, however exposed, permanent carbonates; and if one carbonate out of the list of carbonates claimed is to mean an oxide, then, if there is any sense in language, all the other carbonates must also mean oxides—but which, of course, they are not, and never become. This isolating one only of the carbonates claimed would never have been attempted—as it would have been too utterly absurd—but it was remembered that in the *Pharmacopœia*, twenty years ago (but not since), there was mention made of a preparation of iron for medicine, and which was, to a great extent, oxide of iron, but it was called in doctors'dog Latin, *ferri carbonas*.

Now it was thought, if we can make it appear that *ferri carb.* is hydrated oxide of iron, we may make out that Laming meant oxide of iron when he said carbonate; and so, under his claim of carbonate of iron, we may get hydrated oxide of iron, and so upset Hills' patent. But this specious attempt, like all the others, failed; for, first, the doctors' stuff referred to was not called carbonate of iron, as Laming calls his, but *ferri carbonas;* and of course, if Laming had meant the doctors' stuff, he would have called it *ferri carbonas*, and not carbonate of iron, and would not have classed it with the other permanent carbonates he has claimed, of manganese, zinc, and lead. But, independently of this, *ferri carbonas* is worth about £60 per ton, and it would thus cost more to purify the gas with it than the total worth of the gas altogether; and it happens that, instead of being hydrated oxide, the *ferri carbonas* of the druggists is generally to the greatest extent anhydrous, sometimes wholly so; and therefore, even if it had been meant by Laming, it would not have disclosed the use of hydrated oxides. But Laming, unfortunately for the defendants, shows how he makes the carbonates he claims, by precipitating them from salts of manganese, iron, zinc, and lead, by rough carbonate of ammonia (*i.e.*, gas liquor); and these carbonates can be used, as they are precipitated, as real carbonates without any difficulty.

I have had the carbonate of iron mixed for weeks with sawdust, in large masses, without its changing to any considerable extent to an oxide; and if any one wanting to use Laming's carbonates had found that one of the four, by exposure to the air, had a tendency to become something else, he would, as a matter of course, if he followed the directions, that carbonates were to be used, prevent its being exposed as much as possible, so that it might be used in the state of a carbonate, as described, in the same way that lime is used, as soon after it is slacked as possible, because it is well known that lime by exposure becomes carbonated, or converted into a chalk. But we have nothing at all to do in a specification with what a thing may become if it is treated in certain ways which are not specified or indicated. All we have to do is with the thing that is claimed and specified, and nothing with what it may become if such and such things are done to it which are not directed, and which might never be done at all; and of course there can be no publication of the use of an article, which something claimed might become if certain things are done which are are not clearly directed to be done. How absurd, then, is it to pretend that out of four carbonates mentioned as the invention, three of them should be real carbonates, and one should be an oxide or anything else? This, certainly, is a most staggering proposition to be seriously made, but it is only a fair sample of the absurdities of which the defence at the trial was made up; yet the writer of the articles in your JOURNAL seems to adopt them all. And now let us examine a few of them. They state, as we have seen, that carbonate must mean oxide; but that is not enough. They next go on to state that oxide means carbonate; but that is not enough. It is next stated that sulphurets mean carbonates; but that is not enough, for it is further attempted to be proved that gas liquor at one time means carbonate of ammonia, and at another time means sulphuret of ammonia. This is only a part of the protean nomenclature adopted, and by the use of which, of course, anything may mean anything it is wished to be. We will now see how these things are made out; and, first, that carbonates mean oxides, which we have already discussed. The writer says it was stated at the trial that the meaning of the phrase carbonate of iron is not, after all, very important, inasmuch as Laming describes a process for obtaining the stuff he calls carbonate of iron, which process would *necessarily yield*, not a strict carbonate of iron, but a hydrated oxide of iron. This, as I have shown before, is not the fact. The process given by Laming gives true and strict carbonates of the metals he claims, and nothing else. To make any one of those carbonates into an oxide, other processes, not mentioned nor indicated, must be adopted, such as drying and exposing to the air after being absorbed into porous material, such as sawdust, &c.; but Laming says nothing of this, but that the carbonates he mentions are to be used either mixed or *unmixed* with sawdust; and the carbonate of iron, if unmixed, might remain a real carbonate for years. As to the phrase, that he damps the carbonates, it may refer to the carbonates of lead, &c., which are to be bought in the market in dry powder, as he claims the said carbonates, however obtained. It certainly would be absurd to suppose that it refers to the precipitated carbonates he shows how to make, as they would be in a damp state, fit to mix with sawdust, or to be put into wet-lime purifiers; and it is not to be supposed that they are to be dried for the mere pleasure of damping them again, especially as the drying would be a very expensive operation, and the only practicable way of drying them would be by a heat that would, if it made them into oxides at all, make them into anhydrous oxides. However, as I said before, we have no right to suppose anything in a specification. If a thing is not clearly mentioned or directed to be done, it cannot be a publication. I have now done with the assertion that carbonates mean oxides. I now come to the next, that oxides mean carbonates. The writer says, in the articles referred to, "No one can doubt that by potash and soda (that is, oxide of potassium and oxide of sodium) Hills meant the carbonates, and not the caustic alkalies." Now, in Laming's case, it was, that by carbonates he meant oxides; now it is just the reverse, and oxides are to mean carbonates, for by the terms potash and soda we are told we are to understand carbonate of potash and carbonate of soda; but why in the world are we to understand that different things are meant to those we are told to use? The specification tells us to decompose muriate of iron with lime, magnesia, potash, or soda. Now, it is clear that the two first of this list, lime and magnesia, must mean the oxides of their respective bases, caustic lime and caustic magnesia, for their carbonates will not decompose the muriate of iron to make hydrated oxides, as we have before shown. Why, then, if the two first of the list are clearly caustic or oxides of the bases,

are the two last in the same list to be carbonates? Why, for just the same reason that one out of Laming's list of carbonates is to be an oxide—namely, that without such transmogrifications as these they have no case to make out against my patent. As a blind, they stated that caustic alkalies would be too dear, but this is a mistake; their real reason is to find a resemblance between my patent and Mr. Laming's, for they say, if Hills decomposes muriate of iron with *carbonated alkali* (this is why carbonated alkalies are wanted instead of caustic), that would make a carbonate of iron, which is what Laming claims; and if that would become a hydrated oxide, so would Laming's. But carbonate of iron would not be produced if caustic alkalies are used as I have directed, but hydrated oxides instead; but even if carbonate of iron were used, as they tried to make out, it would make no difference; for, instead of being the ultimate result of the process, as Laming's carbonate is, mine would be only in the first stage of the process directed to be used, for they are afterwards to be absorbed into sawdust, to be converted into hydrated oxides by exposure to the action of the air. The method of oxidizing the various precipitates is thus described in my specification:—"To prepare the hydrated or precipitated oxides of iron I take the precipitated sulphurets of iron, and mix them with or absorb them into sawdust or other porous material, and then expose the material so made to the air, to absorb oxygen, whereby the oxides are obtained." We now come to the next plea that they make—that *sulphurets mean carbonates*. They state that I have given a plan in my specification for decomposing a salt of iron with hydro-sulphuret of ammonia, by which process I obtain *carbonate of iron*. Only fancy! carbonate of iron from decomposing a salt of iron by hydro-sulphuret of ammonia! Well, this is worse than the previous attempts to make out that carbonates mean oxides, and that oxides mean carbonates. But of course such an assertion as this is not made without a design; and this is how it is done, as stated in the articles referred to:—"Among the processes described by Hills for making hydrated oxides of iron, there is one *identical* with the process of Laming for making the so-called carbonate of iron. By the action of hydro-sulphuret of ammonia, or *gas liquor*, upon sulphate or muriate of iron, Laming obtains an impure carbonate of iron." Now, the process which I have given, which is said to be identical with this, is to decompose a salt of iron by hydro-sulphuret of ammonia; and because gas liquor, which is nearly all carbonate of ammonia, happens to contain a small quantity of hydro-sulphuret of ammonia, it is attempted to make out that hydro-sulphuret of ammonia means gas liquor, and will, when decomposed with a salt of iron, make carbonate of iron. But hydro-sulphuret of ammonia is no more gas liquor than brandy and water, and it would no more produce carbonate of iron than it would produce cast steel. Why, only a few lines before it is stated in the same paper that gas liquor contains carbonate of ammonia, and that this would precipitate from sulphate or muriate of iron, carbonate of iron. The same liquor cannot be sulphuret and carbonate too; and certainly, if it were a sulphuret, which I claim, it would not produce a carbonate. This attempt to make out that gas liquor is at one time a sulphuret, to bring in my plan; and then to say it is carbonate of ammonia, to bring in Laming's plan; and then to say that they are both identical, is, I think, the most barefaced attempt at mystifying a judge and jury who do not understand chemical terms that I have ever met with. Of the same character, however, was the attempt to make out that the mixture of hydrated oxides of iron with muriate of magnesia, which I have claimed, was identical with, or exactly similar to, Laming's mixture of chloride of calcium and oxides of the metals he has claimed. It was kept out of view that my patent included renovating the materials, and that Laming's did not; and that by the first purification and renovation my muriate of magnesia would, by taking carbonate of ammonia from the gas—and for which purpose it was mixed with the oxide—become carbonate of magnesia, which has no resemblance at all to Mr. Laming's chloride of calcium, and would not, like chloride of calcium, prevent the renovation of the oxides. But, if Mr. Laming's mixture of chloride of calcium became carbonate of lime, it would no longer be his mixture, and would not come under his patent or claims.

But supposing that Mr. Croll or Mr. Laming had used hydrated oxides of iron in the way they describe, even then it would not affect my patent; for it is a great mistake to suppose, as it was endeavoured to be proved at the trial, that because I have put the claim for my invention in two parts, that therefore, if the things claimed as a whole, and making one method, had either of them been separately used before, it would vitiate my patent. This is not so, although it suited the defendants uncommonly well to try to make it so. We have only to read the specification attentively to see this: I state that my improve*ments* consist of *a method* of purifying gas and of renovating the material. I do not say my improvement consists of methods. If I had said this, and had two claims, then each claim might have related to one of the several methods; but I have only one method for my invention, and the two parts of the claim show the two improvements of which the one method consists. The claims are not two separate claims, independent of each other, although, for the sake of clearness, they are put firstly and secondly, but both claims make the one method described. We shall see this quite clearly by reading the claim, as follows:—"Having thus described my invention, and the manner of carrying the same into effect, I proceed to state my claims *in respect thereof*." Each claim, therefore, supposing there are two, is in respect of the invention, and is not an independent claim irrespectively of the invention. If, therefore, one claim could be separated from the other, and could be restricted to the use of the material without renovation, it would be irrespective of, and would have nothing to do with, the invention; for the invention is not for the use of the material without the mode of renovating it, as, of course, it would be perfectly useless; and if the claim for renovation were separated from the claim for the material employed, it would not be in respect of the invention, for it would have nothing to do with it, as the invention is not for renovation. There is, therefore, really only one claim, divided into two parts, in the same manner as a discourse is divided into several heads.

Each part relating to, or describing a part of, the invention, and the invention being for both parts, one claim cannot be independent of the other, but the two together make the one method or the whole process described. It is, therefore, in error to say that I claim hydrated oxides alone. I do not do this. I only claim them in respect of the invention which includes renovation, and, therefore, I do not claim them without renovation; and if hydrated oxides of iron had been used by anybody before my patent, and my method of using and renovating them as a whole was an improvement on what had been done before, I could sustain a patent for that method. It is, therefore, immaterial to me whether Croll or Laming ever used hydrated oxides of iron, as the way they used them (supposing that they did use them, which I deny) would not affect my patent.

It now only remains for me to say a few words on Messrs. Laming and Evans's experiments at Westminster, which are pretended to vitiate my patent. Now, the only detailed account we have of their experiments is in Mr. Evans's report to his directors of the result of those experiments on January 26, 1850, about two months after the date of my patent, by which it appears that he only tried two experiments, in August, 1849; for he says, after taking the material out of the purifier the second time—"I suggested that, instead of taking the material out of the purifier, it would be more economical to renovate it in the purifier."

The first time of doing this was the 22nd of October, 1849; he then says that after this period—but at what time is not stated—it was used over and over again six times. He then goes on to say that, instead of trying it in the experimental purifiers, he determined to try it on a larger scale, which he commenced on the 20th of December, 1849, about a month after the date of my patent. This experiment, he says, was a failure; the material would not purify the gas Various suggestions are made as to the cause of its not purifying; and Mr. Evans goes on to say on the 26th of January, 1850, "Here the matter rests. The material is still in the purifiers, and does its work very partially. *In fact, it is quite useless as a purifying material.* What it may do if the suggestions of Mr. Laming are carried into effect, I cannot say." Now, this report to the directors of the exact result of the experiments is no doubt a true state of the case, without any of the varnish that was given at the trial; and it amounts to this, that Mr. Evans, before the date of my patent, made a few private experiments for Mr. Laming, in the back-yard of the Westminster Works, known to nobody but himself and his workmen and his friends, which, on Jan. 26, 1850, were a failure, and would not purify the gas. Let the failure have arisen from what cause it may is of no consequence—it was no finished invention, but was their only experiment; and whether they had done the same as I had before the date of my patent is of no consequence, as it would only prove that two people were trying the same thing at the same time, and whoever succeeded first would be entitled to a patent. But Messrs. Laming and Evans were not experimenting on the same material that I have patented, but on a mixture of chloride of calcium and oxide of iron, which I think is a useless material for purifying gas, and of which I have disclaimed the use. Also their experiments on renovation appear to have resulted in quite a different method to mine, for in the patent which they took out in 1850, and in the deposit-paper for that patent, they show that by their mode of renovation they form sulphuric acid, and they give a process for saturating gas liquor with it. They also claim the use of hot or warm air to renovate with, and they also say that the presence of lime is necessary for their mode of renovating and purifying. All this is claimed after the publication of my specification. My plan of renovation is quite different to this: the presence of lime is not necessary, no appreciable quantity of sulphuric acid is formed, and warm or hot air is not necessary, but injures the process of renovation. It could, then, scarcely be pretended that these experiments of Messrs. Laming and Evans could affect the validity of my patent, which differs so essentially in the mode and results of renovation, and in the material used, even if their experiments had been well known and published to the world. But so far from this, the material they experimented upon is disclaimed by me; and so far from there being any publication of their process before the date of my patent, by their own showing two months after they had no fixed plan, and did not know why their experiments did not then succeed, and why their material would not purify the gas. They also must have sworn, when they took out their patent in 1850, that their invention was then new and unknown to the world. How, then, can it now be pretended that their experiments before the

date of my patent were a publication of it, when they themselves, to obtain their patent, three or four months after the date of mine, must have sworn, or made a solemn declaration, that their method was then new and unknown?

If Mr. Laming had a paper when he opposed me in September, 1848, which mentioned renovating oxides of iron, it would be a different method to mine, as he says his plan converts the material partly into sulphate of iron, whereas by my mode of renovation sulphate of iron is not formed. Whether Mr. Laming had a French patent for hydrated oxides of iron before the date of mine is of little consequence, as it would not affect the English patent, which I obtained without any knowledge of his; and if he really was the first discoverer, I am quite ready to give him the honour of being so; but it certainly does seem very strange and incredible, that if he knew how to purify gas by hydrated oxides of iron, and to renovate them so that they might be used many times over, he should tell Mr. Evans in June, 1849, that they would not do, as they were too dear; and it is still more strange that when, at Mr. Evans's request, he agreed to try the process, and suit him in the material, he never mentioned that it could be renovated or used over again, when the success of the plan entirely depended upon its being repeatedly used, and in which case it would not have been too dear. Mr. Evans said, in answer to Sir F. Thesiger,—"Mr. Laming told me in June, 1849, that he had a plan of purifying by means of oxide of iron."—"Did you ask him to try the experiment on oxide of iron?" "I did."—"What did he say?" "He said it was too expensive to use."—"After you observed that it renovated and could be used again, did you tell Mr. Laming what you had discovered?" "I did."—"Were any observations made by Mr. Laming about it?" "*None whatever;* nothing to lead me to think he knew of it." Now, certainly, it seems to exceed belief that if Mr. Laming had known anything about renovation in June, 1849, that he should not have told Mr. Evans that the material he sent him in was to be renovated and used over and over again, and that when Mr. Evans told him that he had discovered that it could be repeatedly used, that he should have made no observation to let Mr. Evans know that he knew it before. This is not how a man would behave who really did know what would happen; he would have said that it was what he expected, or something of that sort. It therefore appears that if Mr. Laming had put on any paper, or on any French patent, that oxides of iron could be used and renovated, it must have been a mere vague idea that had come across his mind, which he had never experimented upon or practised, and which he must wholly have forgotten; for I have no doubt that if he had thought it was of any use, he would certainly have patented the plan in England before he allowed Mr. Evans to try it; but however this may be, does not affect my rights. I have only to show that my plans are different to the experiments of Messrs. Laming and Evans, and that I obtained a patent for them long before they had finished trying their experiments. Now my witnesses proved at the trial that I used and renovated hydrated oxides of iron for purifying gas, even before the date of Mr. Laming's French patent, and of course long before Mr. Evans began his experiments, or observed that the material Laming sent him could be renovated and used over again; and therefore, if Mr. Evans had told me of what he had done, or if I had seen any oxide in use at Westminster, it was long after I had done the same thing myself. But it is now quite clear that any communication that Mr. Evans made to me did not relate to anything about oxides of iron or renovation, for he stated himself, before Mr. Rotch and at the trial, that the communication he referred to as having made to me was on the occasion of a great storm in 1849, when I remember having seen Mr. Evans at the works, but which storm occurred on the 26th of July, which was before he began his experiments at all, and I was not there during any other storm. The insinuations that I or my brother must have seen the oxide renovating at Westminster, and so have learned the process, which it was proved I practised at the end of 1848, I consider beneath my notice. I was not at the works at any time when Mr. Evans says he was experimenting on oxides of iron, and it is not probable that my brother was either, as the scrubber he had to see filled was finished in July, after which he only visited the works for a few times, for a few minutes, to test the strength of the liquor from the scrubber up to the end of September, and during which time, it appears by Mr. Evans's report, only two experiments were made in the experimental purifiers.

As to the assertion that evidence was given by numerous witnesses at the trial that Mr. Thomas Hills was frequently at the works for days together, I have only to say that it is, like most of the other statements and arguments, a perfect delusion, and utterly untrue; as also is the statement that, by my own showing, I have patented the crudest notions of my brain without any experiments whatever; as also is the statement that I am a man eager to patent anything; and as also is the statement that the same workmen who assisted at Laming and Evans's experiments, at the same time assisted Hills at the scrubber, for Hills had finished filling the scrubber in July, which was before Mr. Evans began his experiments at all, and consequently after that time Hills had no workmen to assist him. And now I have done, and will leave this much-discussed matter to rest on its own merits; and, in conclusion, I must say that I think the gas companies have been badly advised to compel me to bring actions against them. They must be quite aware that this oxide-of-iron process of purification does not, at all events, belong to them; and whether it belongs to me, as decided by the verdict of the jury, or whether it belongs to Mr. Laming, as they tried to prove, they are equally unjust in refusing to pay me the small royalty demanded. I have made an agreement with Messrs. Laming and Co., by which they have given to me all claims they may have to the right to purify gas by hydrated oxides of iron; therefore, in paying me a royalty, they pay the right inventor of the process, whether it is Mr. Laming or myself; and, consequently, I cannot see how, in common justice, they can refuse to do so, or why they should force me to spend so much time and money in law.

F. C. Hills.

Chemical Works, Deptford, Oct. 8, 1858.

HANSOR'S OLEFIANT GAS COMPANY.

Sir,—In April, 1856, you concluded some remarks on the above company, in your "Circular to Gas Companies," by saying "there were few localities in Great Britain where Mr. Hansor's system could be economically introduced;" and in the following May I ventured to state in your Journal, that "so long as ordinary Newcastle coal kept under 50s. a ton, and Boghead, or other equally good cannel, under £10 a ton, there were no other gas-producing substances which could compete with them." To these joint remarks Mr. Hansor replied in the following number, that he "dissented from your opinion, and did not estimate very highly mine," and "that he had been treated very uncourteously by several persons in the gas trade, who took him for an enemy, but who would eventually discover their error."

Now, judging from an advertisement by Messrs. Fuller and Horsey which I notice in your Journal, it would appear that these gentlemen have already brought to the hammer the whole of the company's plant at Barnes, in Surrey, where the works were erected, from which circumstance I should imagine both Mr. Hansor and the company have found out *their* "error." I wish to be as gentle as possible in reminding Mr. Hansor and others that it must be folly to attempt to make, by artificial means, a gas-producing substance, when a better and cheaper one can be obtained produced by nature.

Geo. Bower.

St. Neots, Oct. 1, 1858.

LIGHTING OF SLATE QUARRIES WITH GAS.

Sir,—A short time since you published a letter in your valuable Journal respecting the lighting of the first slate quarry by me with gas at Festiniog, North Wales. Since then I have received numerous inquiries from gas manufacturers and others respecting its value in this respect. Permit me to reply to them, through your Journal, by giving a copy of a letter received this morning from the proprietor of the slate quarry, Samuel Holland, Esq.:—

Plasyn Peurhwyn, near Portmadoc, N.W., Sept. 30, 1858.

Dear Sir,—The gas apparatus you erected here continues to work very satisfactorily. I have just had a gas-fitter engaged in moving all the burners more forward in the different openings, as the rock has been worked some distance in advance of the first fixings. While the fitter has been so engaged, the gas has been turned off other openings. When there was no gaslight, the quarrymen remarked to my foreman that they might as well go home until the gas-fitter had finished. The men were then desired to proceed with their quarrying work with candles. This they objected to, saying that candles would not afford them sufficient light to carry on their work. This shows the value of the gas. Indeed, I find they do much more work in those places where the gas is in use than where it is still lighted by candles.—Yours very truly,

Samuel Holland.

To George Walcott, Esq., 24, Abchurch Lane, London, E.C.

If you deem these particulars worthy of notice, please publish them.

George Walcott.

24, *Abchurch Lane, London, Oct.* 1, 1858.

Register of New Patents.

574.—John Bramwell, of Buxton, in the co. of Derby, engineer, for "*Improvements in apparatus for the prevention of accidents arising from the escape of gas.*" Patent dated March 19, 1858.

This invention relates to gas-burners used for illuminating, heating, or other purposes, and consists in the adaptation throughout of apparatus which causes the supply to be shut off upon a diminution of heat taking place, owing to the flame having become extinguished. For this purpose metal or other substance is caused to be heated by the combustion of the gas, and during that heated state the expansion of the said substance will cause a valve or cock to continue open; but upon a contraction thereof, owing to decreased temperature, the valve or cock will become closed.

In order to carry this invention into practical operation, various arrangements or modifications may be adopted. In the case of a gas stove, the improved apparatus is arranged as follows:—Between the pipe which conveys the gas from the main and the burners there is a small chamber furnished with a seat for a valve. This valve is formed upon the end of a rod which passes through a stuffing-box, and, having extended across the situation occupied by the flame from the pipe, abuts against a set screw. Behind the valve is a spring, which therefore tends to force forward the said valve to its seat. The thoroughfare, however, for the gas may be kept open by pushing backward the rod, and then turning upwards a catch so as to bring it against a stop fastened by a set screw to the rod. The operation of this arrangement is as follows:—According to the position of the parts shown in the drawing the stove is lighted, and the flames, by heating the rod, have caused an expansion thereof, which keeps the valve open for the free passage of gas; but supposing a diminution of heat to take place by the gas becoming extinguished, then the rod will quickly cool, and by its contraction will draw the valve into its seat so as to shut off the supply of gas, and therefore prevent an escape which would

otherwise arise. In order again to light the stove, the rod is pushed back to open the valve and allow the gas to pass, in which position it is kept by turning backward the catch until it intercepts the stop. This will allow a sufficient supply of gas to the burners for being lighted, and their heat will then expand the rod so as to still further open the valve, in which position it will be kept as long as the heat is maintained. The drawings attached to the specification represent a gas bracket and burner in section. The bracket is of the usual construction, turning upon the plug, the upper part of which is furnished with a chamber, to which is adapted the seat and valve, the action of which and the expansion-rod is similar to that previously described.

Another adaptation of this invention is also shown in the drawings, figure 3 of which represents a portion of a chandelier with the improvements applied. The gas enters through a central tube as usual, and passes from thence into a chamber, within which is the valve, and this valve opens or closes a passage which leads to a chamber, from which all the burners receive their supply, and it may be, therefore, caused to prevent an escape of gas from the whole of them at the same time. The expansion-rod passes through the flame as before, but in this instance, instead of the stuffing-box, there is a disc of indiarubber, or other flexible material, which allows sufficient motion for the rod without permitting an escape of gas. Upon contraction of the bar taking place, owing to the chandelier becoming blown or otherwise put out, it will, on becoming cool, close the valve as before, and by thus shutting off the supply to the chamber, prevent an escape from any of the burners. In order to keep the valve open for lighting the burners, the rod is pushed backwards and a thin disc of metal moved upwards so as to catch the stop. On the expansion of the rod having taken place, the disc will fall downwards.

Figure 4 in the drawing represents a modified method of applying the extension-rod. In this instance it is connected at its end to a lever, which turns upon a fixed centre, and carries at its lower part a rod, to which the valve is fixed. As the expansive force acts through the intervention of the lever, the expansion-rod may be shorter than that previously described.

The patentee desires it to be understood that, although he has described certain methods of carrying his invention into operation, he does not intend to confine himself thereto, as many modifications may be made without departing from the principle. For instance, the expansion-rod may be a coil, or of other form, and may be placed in any situation which will admit of its being heated sufficiently, or a fluid may be employed in place thereof; and in such cases as those of chandeliers where a number of burners are employed, an expanding rod may, if desired, be supplied to each burner.

The claim is for the application of a rod, or other solid or fluid acting by expansion and contraction, for the purpose above set forth.

614.—Henry Gerner, of 10, Newton Road, Bayswater, London, C.E., for "*Improvements in apparatus for the manufacture of gas from oils or fatty or resinous matters.*" Patent dated March 24, 1858.

This invention consists in the construction and adaptation of the retort so as to regulate and economize the heat, increase the production of the gas, and afford facilities for cleansing and repairing. The retort is constructed of cast iron, or other suitable metal or material, of a cylindrical taper or other convenient form, and through the centre, from the base upwards, is constructed a flue or chimney, and at the sides of the retort are arranged two or more pipes (three are preferred), which form flues leading from the outside of the retort through it and into the central flue. The top of the retort is made of a separate piece, and is fitted securely by means of a joint of molten lead, or other fusible metal. The retort is erected upon bricks or fire clay, so as to leave a space between the clay or brickwork. The fire is placed at the base of the retort, and by means of a damper the heat is caused to pass either up the central flue or the sides and through the said pipes, or both ways.

The oil, or fatty or resinous matter, is supplied through one or more feed-tubes (three preferred) arranged with syphons and funnels and made secure through the top of the retort with their outlet orifices near the internal base of the retort, and near the central flue. In the interior of the retort a grate is arranged above the orifice of the said feed-tubes, and upon this grate, and around the central flue and pipe-flues and feed-pipes, some material is placed which is capable of sustaining a red heat. For this purpose scrap iron is preferred, or earthenware, or cokes, or a mixture of these. The gas or vapour of the oil arising from the heated base of the retort will thus pass through the grate, and the said materials thus rendered more subtle. From thence the gas is passed in the ordinary manner through a pipe from the top of the retort into the condenser, and subsequently into the gasometer. There is also arranged, or cast with the outside of the retorts, two pipes or passages which protrude from the brickwork or outside of the stove, and are fitted with the "man-hole" lids or covers, which may be removed at any time it is desired to clean or repair the interior of the retorts.

678.—William Oldfield, of Skipton, in the co. of York, optician, and Thomas Ogden Dixon, of Steeton, in the same co., manufacturer, for "*Improvements in gas-burners.*" Patent dated March 30, 1858.

The improvements relate to the application over the slits or perforations of gas-burners of a cap or cover, forming a chamber with a slit or openings therein, so that the gas to be consumed passes from the first opening or openings into a chamber, thence through a slit or openings therein for ignition.

The openings in the cap or cover are applied so that the direction of the flame thereby produced may be at an angle to that which would be produced by the passing of the gas through the first slit or openings; and the second slit or openings are formed of a considerably larger area than the first.

The inventors say that they do not confine themselves to the precise details shown and described, so long as the slit or openings for the escape of the gas from the upper part of the chamber or cover is at angle to, or across those by which the gas escapes from passages substantially as explained.

703.—Thomas Greenshields, of No. 11, Little Tichfield Street, London, for "*Improvements in treating ammoniacal liquor produced from coal in making gas, and obtaining useful products for making artificial manures.*" Provisional protection only obtained. Dated April 3, 1858.

The invention has for its object improvements in treating the ammoniacal liquor to obtain the salts of ammonia, from which may be obtained other products for making artificial manures. For this purpose the ammoniacal liquor is subjected to the action of sulphate of lime in a vessel, which the inventor calls a decomposing pan. When the sulphate of lime has become decomposed the ammoniacal liquor is run off into another vessel, in which sulphuric acid is added until sulphuretted hydrogen ceases to be evolved; after which, a fresh quantity of sulphate of lime is added and heat applied (the liquor must be frequently skimmed during the operation to remove the impurities that arise), when it must be allowed to settle; and the liquor is then to be run off, when a little more sulphate of lime is to be added, and evaporation continued until the whole of the tar is removed or precipitated with the lime. When settled to be run off into a clean pan and allowed to crystallize or evaporate to a salt.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

2082.—José Luis, of 1b, Welbeck Street, Cavendish Square, London, patent agent, for "*Coke and gas-kilns.*" A communication. Sept. 14, 1858.

2119.—Léon de Pariente, of Paris, gentleman, for "*Improvements in apparatus to be applied to gas-burners with the object of increasing the lighting power of the gas flame.*" A communication. Sept. 21, 1858.

2137.—Alfred Fauvin Jalourеau, of Paris, manufacturer, for "*Improvements in the manufacture of pipes.*" Sept. 23, 1858.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

1145.—Frederick George Underhay, of Wells Street, Gray's Inn Road, London, and Josiah Latimer Clark, of Haverstock Hill, Hampstead, London, for "*Improvements in cocks or taps, and in apparatus for flushing.*" May 22, 1858.

1195.—Vincent Louis Vodoz, of the Westminster Club, Albemarle Street, London, for "*An improvement in the chimneys and glasses of gas and other lamps.*" May 27, 1858.

1944.—Frederick John Evans, of the Chartered Gas-Works, Horseferry Road, Westminster, engineer, for "*An improvement applicable to gas purifying.*"

2087.—Alfred Hope John Bastable, of Belgrave Works, Ranelagh Road, Pimlico, London, for "*Improvements in apparatus employed in the production of light.*" Sept. 14, 1858.

Legal Intelligence.

IN THE ARBITRATION OF THE GREAT CENTRAL GAS CONSUMERS' COMPANY AND MR. ALEXANDER ANGUS CROLL.

(*Continued from page 572.*)

Sixteenth Day—*continued.*

At the request of the umpire, the following report, which appeared in the company's minute-book, was put in:—

Dr. Leeson and Professor Graham's Report.

April 15, 1852.

In a minute of the board of directors of the Great Central Gas Consumers' Company, transmitted to us by the secretary, Mr. Massey, with a note of date Feb. 3, 1852, we are requested to report to the board respecting the illuminating power of the three following gases relatively to each other.

1. Of the gas, as described in the report of Professor Graham and Dr. Leeson, forming the foundation of Mr. Croll's contract.

The gas in question is described in our report of Oct. 22, 1849, as having, when burnt in an argand burner of 16 holes, at the rate of five cubic feet per hour, an illuminating power of 9¼ spermaceti candles, each burning 131·5 grains per hour.

We had fixed upon it as a fair average of the gas supplied by the two then existing City companies, as observed by us on the occasions referred to in our report.

2. Of the gas as described in the company's bill.

This gas is described in the bill as possessing an illuminating power, when burnt at the rate of five cubic feet per hour by an argand burner of 15 holes with a 7-inch chimney, equal to 12 wax candles burning 120 grains per hour.

The result of an elaborate comparison made by us of sperm and wax candles is, that 12 wax candles burning 120 grains per hour are equal in illuminating power to 8·4 sperm candles burning 131·5 grains per hour. Consequently, the gas as described in the company's bill is equal to 8·4 sperm candles, while the gas of our report of 1849 is equal to 9·5 such candles.

The gas of our report of 1849 would be equal to 13·5 of the wax candles of the company's bill.

Hence the illuminating power of the two gases referred to may be compared as follows:—

	In Sperm Candles.	In Wax Candles.
Gas of Graham and Leeson's Report	9·5	13·5
Gas of Company's Bill	8·4	12·0

3. Of the gas as it has actually been supplied by Mr. Croll.

We have not had much opportunity of examining the gas supplied till the last three months, during which period we have found it to vary from 10·5 to 13·5 sperm candles. This expressed in wax candles of the bill is an illuminating power ranging from 15 to 19·3 wax candles, and seldom below 18·6 wax candles.

The gas supplied by Mr. Croll appears, therefore, to have generally exceeded considerably the standard of wax candles required by the company's bill.

The method of proceeding by which we arrived at the relations in illuminating power above reported was adopted after much preliminary experimenting, and the investigation considerably protracted, from our anxiety to obtain a satisfactory conviction of the accuracy of our estimates.

It was found necessary to ascertain the rate of burning of ten different supplies of wax candles, procured from six respectable dealers in the City, the experiment being made upon six candles of each supply.

We thus fortunately fell upon one supply of wax candles which may be said to coincide with the wax candle of the bill; they were the long sizes of Mr. Wilmot of No. 66, Gracechurch Street.

The set of six of these wax candles were applied in succession to determine the illuminating power of the gas of the Phœnix Company upon a particular occasion.

The gas was burnt, as usual, at the rate of five cubic feet per hour, and its illuminating power, which remained constant, is expressed by the number of each candle which would be required to produce an equal light.

Wilmot's Long Sizes, Wax.

Wax Candles.	Wax burnt per hour in Grains.	Number of Candles equal to the Gas.	Wax in Grains equal to five cubic feet of the Gas.
A	120·7	16	1931·2
B	106·2	18	1911·6
C	120·2	21·5	2584·3
D	114·9	13	1493·7
E	123	14·33	1775·4
F	129·8	15	1947·0
	119·1	16·3	1940·5

It thus appears that 1940·5 grains of wax in candles of this particular size are equal in illuminating power to five cubic feet of the gas taken at present as a standard.

This gas is also equal to 16·17 wax candles of the bill, for 1940·5 divided by 120 (the wax burnt per hour in the wax candle of the bill) gives 16·17 candles.

A set of six sperm candles were burnt at the same time, one of which was our original standard sperm of 1849, and the other five candles selected from their rate of burning being nearly equal to that standard sperm candle.

Various Long Sizes, Sperm.

Sperm Candle.		Number of Candles equal to the Gas.	Sperm burnt per hour in Grains.	Sperm in Grains equal to five cubic feet of the Gas.
From Hall	No. 1	10·5	140·3	1473·1
,,	No. 2	13	131·7	1712·1
,,	No. 3	10·25	137·1	1405·2
From Wilmot	No. 1	11·25	133·1	1497·3
From Wickenden	No. 2	10·33	134	1384·2
Candle of 1849		10·75	134·5	1445·8
Mean		11·0	135·1	1486·2

It follows that 1486·2 grains of sperm burnt in candles of the present size are equal in illuminating power to five cubic feet of gas.

Hence 1486·2 grains of sperm are equal in illuminating power to 1940·5 grains of wax burnt in candles of the sizes used.

The standard sperm of our report of 1849 burnt, when then used, at the rate of 131·5 grains per hour.

The illuminating power of the gas above is, therefore, equal to 11·3 such candles; for 1486·2 divided by 131·5 is equal to 11·3 candles.

The same gas is, therefore, equal in illuminating power to 16·17 wax candles of the bill—11·3 sperm candles of our report of 1849.

We thus arrive at the relation between these wax and sperm candles, 16·17 of the wax candles being equal to 11·3 of the sperm.

Now, the gas described in our report of 1849 had an illuminating power of 9·5 such sperm candles.

This is the same thing as 13·54 wax candles of the bill, for

Sperm.		Wax.	
11·3	9·55	16·17	13·54

Further, the value of the standard gas of bill, which is 12 wax candles, may now be expressed by 8·42 sperm candles, for

Wax.	Sperm.	
1354·12	9·5	8·42.

It was in this manner that the relations were obtained between the gas of the bill, the gas of our report of 1849, and the gas as supplied by Mr. Croll, which are expressed earlier in the report. But in addition to the connected series of experiments upon which these conclusions are immediately founded, several other less complete series of experiments were made by us which all confirmed the average adopted.

We may be allowed by the board to avail ourselves of this opportunity to communicate very briefly some observations of a more general nature which we have had occasion to make during the present inquiry respecting the illuminating power of gas, or while engaged in other inquiries of a similar nature.

Spermaceti appears to be greatly preferable to wax for the trial candle for the photometric experiments.

The wax we find burns with much less regularity both in different candles of the same set, and in different portions of the same candle, than sperm does.

The trials upon the six wax candles already given in the table strongly illustrate this irregularity; and it was equally great in the other nine sets of wax candles which we burnt. The wax candles gutter frequently; their wick is soft, and burns imperfectly. It is known also that the wax candles are not uniform in composition, a small addition of spermaceti being generally made to the wax for the purpose of improving the colour of the latter.

The sperm candle selected should burn about 140 grains per minute, this being the description of long sizes of sperm most easily to be had. It would be an advantage also if the candles were spring made and twelve months kept.

It is to be observed that a candle rarely attained a uniform rate of consumption and illuminating power before it is burnt for half an hour. This point must be attended to both in the photometrical experiment, and in determining the rate of burning of the candle.

After the slightest movement is imparted to a candle its illuminating power is deranged, and several minutes may elapse before it becomes again steady. Hence a photometer in which the candle is moved and not stationary is objectionable.

The sperm candle recommended burns with a flame having a uniform height of two inches. It should be burnt with its twisted wick bent, so that its extremity is just emerging from the flame.

The point of the wick should not be turned towards the gas-burner, but at right angles to it.

Comparative observations of importance, made at different times, should be made under conditions of barometer and thermometer as nearly equal as possible. The walls of the apartment should be black, and the eyes of the observed should be protected from the direct action of the light by screens properly placed.

When we begin to pass gas through a meter, or change from one gas to another in the meter, it is necessary to observe that a longer time elapses before the gas passes in a pure and uniform condition through a dry meter such as Mr. Croll's than in the wet meter. Air remains longer in that compartment of the dry meter, which is emptied less completely than the other; and while this inequality of composition exists, a jumping and variation of the flame is observed. The dry meter is to be preferred, notwithstanding, in photometrical experiments.

The use of a vulcanized indiarubber tube to convey the gas to the burner of the photometer should be avoided, as such a tube often reduces the illuminating power of gas passing through it very sensibly by absorbing and withdrawing naphtha vapour from the gas.

For the translucent disc in the photometer, thin paper placed between two perforated cards* appears to have advantages over the oiled paper generally employed, particularly where the gas and candle flames are not equally white, and differ in colour. Besides observing the illuminating power of gas it might be well to attempt to estimate also the whiteness of its flame; as of two gases having an equal illuminating power, that gas which brings out colours most vividly (like daylight) would have a preference given to it by the public.

(Signed) THOMAS GRAHAM.
London, April 2, 1852. H. B. LEESON.

Cross-examination of Mr. *Dakin* resumed: At the date of Mr. Croll's report I was not aware that the price of coke was 6s. 6d. I may state generally that it was not a matter within my province. I carefully abstained from interfering with the price of products. Mr. Croll had his contract with the company, and it was my care to see it carried out, and the price of products had nothing to do with me.

By the UMPIRE: Mr. Pontifex is now in the employ of the company, and has been so for five years. The mains outside the works have been under his care from 1852, and it has been our earnest endeavour, and our constant instructions, that they should be kept in perfect repair, and all escape and damage immediately made good; and I believe it has been carried out by our servants, Mr. Pontifex and others. I do not think Mr Pontifex would be an authority of much value on the subject of leakage, between the works and the consumers; I think he is more of a practical man with regard to the working of mains, repairing mains, seeing consumers, and taking care that their complaints are remedied. I should not take Mr. Pontifex as an authority on any large question of that kind. It is not his department. Mr. Croll was first registered as engineer, when the company was about to be established; I do not think we had bought the land. He was, in point of fact, the person to whom we looked for the establishment of the company; he was the promoter, and the party most anxious for it, and the moving party from the beginning. He had no appointment as engineer; his name appeared on the prospectus as the party whose scientific knowledge was depended upon to erect the works and set them going; for that Mr. Croll was paid. Mr. Croll had no other appointment from the company, nor did he do any work, except that for which he was paid. I was in error when I stated that we had opened an account for extra illuminating power in our books. I have made inquiry of the chief clerk what the amount, moneyed out by Dr Leeson's report would come to, and he got the statement, and made the reply to me; it is about £4000 to be paid to Mr. Croll whenever the company have a surplus, after dividing 10 per cent. among the shareholders. It has been treated in the office as a contingent claim, not likely to come into operation, and, therefore, we have kept the elements for computation; but it has never been made in any way, or entered in any book. I am told the only elements we have are Dr. Leeson's reports, which of course can at any time be moneyed out, but they are not entered in our books in any way, that contingency not having arrived; but we have the means of arriving at it.

The UMPIRE: I see here stated, "Deduct sums received in excess of rental to June 24, 1857, £5019." Was that sum paid to him?

Witness: No precise sum of that kind. I do not understand that.

Mr. LLOYD: When he introduces this item of unaccounted-for gas, he does not give any credit in respect of public lamps, and the probability is, that this is for payments made on that account and for illuminations.

Mr. CROLL: That is so.

Mr. ARCHIBALD: The £5019. 3s. 2d. is sums of money paid to him at various dates up to that time for public lamps.

Mr. CROLL: And other matters.

The UMPIRE: What are the other matters?

Mr. CROLL: Gas made up to the 25th of July.

The UMPIRE: Is there any payment in that £5019 for any gas paid for or allowed to you in the half-yearly account between you and the company?

Mr. CROLL: The sum there has been paid on account of the public lamps and for gas made up to the 25th of July and the illuminations.

Witness: In point of fact, we do not adopt that statement in the slightest degree. We say that the accounts have been balanced up to Midsummer last year, and, therefore, there may be something due from Midsummer to July, when we took possession of the works, but we have paid all claims except that amount.

Mr. LLOYD: It is clear how he introduces this. He treats as an item all the gas employed in the public lamps and all the gas for illuminations, and he is obliged to give us credit for this amount.

The UMPIRE: There were some costs incurred before Parliament, and the evidence that we have heard did not touch that, and as I want it to be complete, I would ask—Did you ever hear, at any period, of a reference being made by Mr. Croll as to any compensation or demand that was to be established respecting his attendance in Parliament?

Witness: Not the slightest.

The UMPIRE: On no occasion?

Witness: It comes on me with perfect astonishment that any claim of that kind should now be made.

Alderman *Thomas Gabriel*, examined by Mr. LLOYD.

I am the deputy-chairman of the company, and have been so almost from the commencement. I am a son-in-law to Mr. Pearson. I have known the whole progress of this matter, and have been a constant attendant at the board-meetings. Mr. Croll has been frequently there, and I never at any time heard him, directly or indirectly, make any claim in respect of his early services in the formation of the company and his attendance before Parliament in this matter. Until about July, 1856, I never knew there was a claim of that kind pending. I never heard from Mr. Pearson that Mr. Croll made such a claim. I have seen the claim that is made for extra expense incurred in preparing for the peace illuminations of 1856. Nothing passed at the board to warrant this claim; it was never mentioned. I think after the account with regard to the illuminations had been made out by our secretary, he did express some dissatisfaction with it and with reference to the illuminating power; but still it went on, and the account was made out, as I believe it had been before. I think Mr. Croll expressed some dissatisfaction—at least, I know he did.

Cross-examined by Mr. ARCHIBALD: I remember a trowel being presented to Mr. Dakin. I believe Mr. Croll was desired by me to obtain it, and perhaps it was presented by me. I went down to the works to see Mr. Croll's books, but not on account of the company or of Mr. Pearson. I never received this account—[copy handed to witness]—from Mr. Rait, nor anything like it. I have the figures that I took from Mr. Croll's books, which were furnished to me by Mr. Rait. We had the books before us. After I had seen Mr. Croll's books, I saw Mr. Purves at the gas-works, Brighton. My object in seeing Mr. Purves was to check some of the figures I had taken from Mr. Croll's books, and they applied entirely to the make of gas; and all questions I put to Mr. Purves were confined entirely to the production of gas per ton of coals—the figures showing a much less result than I believed to be correct, and I was desirous of checking by Mr. Purves the correctness of these figures. I have not got those figures with me. They were for the three years, 1852, 1853, and 1854; and I found that Mr. Croll was not making a profit. I dare say I communicated that to Mr. Pearson. I put one or two questions to Mr. Rait at the time which altogether altered the showing of these accounts. They showed too much loss by production of gas than I thought correct, and I remarked to Mr. Croll—"I dare say a great deal of this arises from the bad coal you told us you got from Messrs. Palmer and Co.; and although this shows a loss, you have to put against that the £8000 or £9000 you received from Messrs. Palmer." That must have been sometime after 1854, but I do not know the precise time. My visit to examine Mr. Croll's books had nothing to do with his relation to Mr. Pearson. Mr. Croll had several interviews with Mr. Dakin and myself, and expressed his dissatisfaction with the contract. He was requiring us to give him a higher price for the gas, and urging us to go to Parliament and get power to charge a higher rate, and to pay him a higher price for the gas. The 1s. 9d. did not remunerate him. Mr. Dakin always said, "I have nothing to do with the matter whether it pays him or not; we have a contract with Mr. Croll." And Mr. Pearson urged us to see Mr. Croll's books, and ascertain whether the concern paid him or not; and Mr. Dakin said he would not go and check out the books, he had nothing to do with it. "There is a contract between us, and he must adhere to that." I went down simply to see how Mr. Croll made it out by his books, and I found that part of the loss of the £7000 was caused by some 2d. a 1000 that had been charged up to the time of these accounts. About July, 1855, Mr. Croll made a proposal for an increase of price, and we had several interviews with Mr. Pearson and Mr. Croll on the subject. I should say that the proposal was never submitted to the board at all, and was merely a matter of interview between Mr. Croll and ourselves. The board knew nothing about it.

Mr. DAKIN: Nor agreed to it in any way.

Witness: It was not even submitted to the board; they knew nothing about it.

* Or a perforated piece of paper placed between two pieces of the same paper.

Mr. DAKIN: It was not only not agreed to, but it never approached that way. The only part of that document that I entertained for a moment was this: there was some talk at that time of the City Company supplying cannel gas, and the only chance we had, if that should become popular, was that we should go to Parliament for powers to do the same thing.

Charles Pearson, Esq., recalled, and cross-examined by Mr. ARCHIBALD.

In reference to the letter of the 29th of April, 1852, which was put into my hands, when I left in the morning I said that I chose to read it before I expressed any confident opinion about it, there are some alterations of mine in it: the first sheet is in the handwriting of Mr. Robert Massey. I do not remember how it came to be in the handwriting of Mr. Massey. If I were to read the document, that might revive my recollection of it; but I do not wish to read it, unless it is desired by one side or the other. I recollect this letter perfectly well, and the contents of it, as well as the circumstances under which it was presented. This letter was written in consequence, I believe, of a dispute between Mr. Dakin and Mr. Croll, which I understood from them both was likely to lead to the entire disruption of their connexion. In consequence of that, I attended with and for Mr. Croll in the preparation of this document, with the view of keeping them together. Mr. Dakin, I understood, had got a new contractor in town ready to take on himself Mr. Croll's engagements, if Mr. Croll desired to quit them; and I was fearful that that should take place, and therefore I consulted between them, and this document was the result. This is a document in regard to paying for the increase of the illuminating power when they paid 10 per cent., and certain clauses connected with that. I never heard of Mr. Croll making any such claim; on the contrary, it always seemed to be understood by all parties that he was to be paid for his extra illuminating power when they could pay the 10 per cent. I am sure it is expressed so; I am confident of it. I acted upon it.

Mr. MAY: Is it not so that it is only the surplus of 10 per cent. that is applicable—supposing they pay 10 per cent. and have 10s. over?

Witness: Then they would pay the 10s. out of that particular half year, but would not pay it out of the other half.

Mr. MAY: Is it a cumulative sum?

Witness: Cumulative until some portion is paid off.

The UMPIRE: They would say it is a part of the expenditure; and if they rise to anything above the payment of 10 per cent., they would appropriate it in payment of this gentleman.

Witness: Certainly.

Mr. MAY: That does not answer my question. Suppose the claim has risen to £18,000, and the next half year they are able to pay 10 per cent. and have £1000 over, how much of that £18,000 is discharged by that £1000?

Witness: £1000.

Mr. MAY: And the £17,000 remains?

Witness: Yes.

Mr. MAY: And to that £17,000 is to be added anything that has accumulated in the half year?

Witness: Yes; and you can never reduce the gas until Mr. Croll is paid off. He has a mortgage upon it.

The UMPIRE: I think I can see what is passing in Mr. May's mind; probably it is illegal.

Witness: As against the consumers it is a fraud of the Act of Parliament. I did not contemplate that at the time; it was not done with any intention of evasion, and if it is illegal, it was not in contemplation of any of the parties.

The UMPIRE: May I recall to your recollection the earlier letter from Mr. Croll, which was the contract between him and the company. Referring to these words—"Whenever the funds of the company shall be able to pay 10 per cent.," and "Whenever the shareholders shall receive 10 per cent."—is that alteration accidental or by design?

Witness: Is that *in pari materiâ* the two letters?

The UMPIRE: It is.

Witness: Then I am not aware of the distinction. It would not be material; but is there any other document *in pari materiâ?*

The UMPIRE: Mr. Croll writes a letter, and the words there used are—"Whenever the funds of the company shall enable them to pay 10 per cent."

Witness: If that is a letter written by me for Mr. Croll, I should like to see it, because what may be in Mr. Croll's mind I do not know.

The UMPIRE: When you had this under your consideration and care, there was not, according to your recollection, any design in its alteration?

Witness: I do not know of the alteration. There can be no design otherwise than is plainly expressed here. I believe all parties were acting in good faith, and I never was more surprised in my life than to find it asserted to be otherwise by the newspapers.

By Mr. ARCHIBALD: I am aware that when Mr. Croll first tendered, the tender was made according to a standard fixed by the report of Drs. Graham, Leeson, and Mr. Clegg; between that time and 1852, a new mode of testing gas had been invented, and the second contract was made according to the new mode. There is a paragraph in the letter to this effect:—"I propose that the standard candle (140 grains sperm) now the measuring instrument, and the conditions of taking observations, and for testing the gas shall be forthwith defined and settled by Professor Graham, Dr. Leeson, Mr. Brande, and Mr. F. C. Cooper." The first reference there, is to the state of things of Dr. Leeson, Professor Graham, and Mr. Clegg, and then it provides for a new state of things to be defined by four gentlemen, Dr. Leeson, Professor Graham, Mr. Cooper, and Mr. Brande; and I was sent to induce Mr. Cooper and Mr. Brande to take part in it, and I gave them a very handsome dinner afterwards at the London Coffee House, in the hope that I had made up all things between the whole of them. It was with reference to Professor Graham's and Dr. Leeson's standard before the letter was written, and these gentlemen were to settle the photometrical mode of measuring the candle. We were ignorant persons.

Mr. CROLL: But not to introduce any different plan to show the illuminating power.

Witness: You and I have discussed this matter before in private.

Mr. CROLL: Is not that so?

Witness: I think not; as I told you before, the whole matter was left to those four gentlemen. You recollect my blaming you for not being with them to assist them to represent your own views and opinions.

Mr. CROLL: I was not allowed.

Witness: You know I always blamed you for it; if you bargained away your own interest, I could not protect you.

By Mr. ARCHIBALD: I recollect the fact of Mr. Clift being there, but I do not believe I ever saw him.

The UMPIRE: You have been asked about the meeting of the 29th of April, 1852. Six days before that, there appears this minute in the company's books:—"Mr. Croll offered to supply the company with gas in lieu of his former contract." That was then read, and ordered to be placed on the minutes. Then Mr. Croll says—"I am to be paid that price provided the company are enabled, out of the profits, fairly to declare 10 per cent. dividend; and in the event of the company not being able to pay out of the profits 10 per cent. in any year, then I am not to have a right to the surplus charged." It is only four days after this that this was entered into—"I am not to be paid anything over the 1s. 9d. until the shareholders have been paid 10 per cent."

Witness: My impression is, that that is a more precise mode of wording it. I do not imagine there was any intended difference. It was no intentional departure from the use of words. If Mr. Bower will show me the original, I shall know by the style of the thing whether it is my awkward way of writing. (*To be continued.*)

Miscellaneous News.

COMMERCIAL GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held at the London Tavern on Friday last, the 8th inst.—CHARLES SALISBURY BUTLER, Esq., M.P., in the chair.

The notice convening the meeting having been read,

The CHAIRMAN said: Our next business in accordance with our Act of Parliament is to affix the seal of the company to the register of proprietors, which with your permission I will now do, merely stating that this list has been carefully examined by three of the directors of the company, and found to be correct.

The SECRETARY then read the minutes of the last half-yearly meeting.

The following statements of accounts and report were taken as read:—

CAPITAL BALANCE ACCOUNT, JUNE 30, 1858.

Dr.		*Cr.*	
To proprietors for paid-up capital	£251,745 13 7	By amount for freehold, plant, mains, services, and meters, Dec. 31, 1857.	£289,237 5 6
British debentures	15,100 0 0	Add for extensions	1,456 8 0
Loans	35,400 0 0		£290,743 13 6
		Balance to trading account	11,502 0 1
	£302,245 13 7		£302,245 13 7

TRADE BALANCE ACCOUNT, JUNE 30, 1858.

Dr.		*Cr.*	
To balance from capital account	£11,502 0 1	By amount due for supply of gas	£18,274 8 0
Amount due to sundry persons	11,562 9 11	Ditto for products	2,685 6 3
Contingent-fund	6,774 13 4		£20,959 14 3
Interest on ditto	685 10 2	Three per cent. Consols invested for interest on contingent-fund	516 2 10
Profit and loss	9,167 15 10	Stock	6,437 15 2
		Balance at the bankers	11,778 17 1
	£39,692 9 4		£39,692 9 4

PROFIT AND LOSS, JUNE 30, 1858.

Dr.			*Cr.*	
To coal consumed		£23,746 8 4	By balance unappropriated	£ 247 2 5
Lime and oxide		757 4 6	Products—Coke, breeze, tar, and liquor	9,593 5 4
Retorts, fire-bricks, &c.		660 16 9	Rental	39,038 19 0
Allowances on collection	£ 80 10 11		Interest on balances at the bankers	30 9 8
Solicitor's charges	110 9 2		Discounts	10 1 10
Plant—British—for repairs and charges	263 9 1			
Ditto ditto ditto	2,246 18 11			
Mains ditto ditto	651 15 3			
Services ditto ditto	503 12 1			
Meters ditto ditto	486 14 0			
Repairing lamps	186 5 9			
Wear and tear of office furniture	29 8 10			
Stationery, printing, and office charges	349 16 3			
Directors and auditors' fees and salaries	2,106 16 10			
Rates and taxes	147 7 8			
Commission to collectors	623 2 11			
Bad debts	215 17 2			
Wages	6,022 10 9			
Interest on contingent-fund	169 7 4			
Ditto on loans	363 9 11			
		14,587 12 10		
Balance		9,167 15 10		
		£48,919 18 3		£48,919 18 3

The directors, in submitting the balance-sheet and half-yearly account ending the 30th of June last, have the pleasure of reporting the continued satisfactory condition of the company's affairs.

The rental of the company shows a steady increase. A higher average price has been obtained for coke during the past half year; in the other residual products the directors cannot state any material alteration.

The profit and loss sheet for the half-year is annexed. It will be seen that a net profit has been realized of £9167. 15s. 10d. The directors therefore recommend the declaration of a dividend at and after the rate of £6 per cent. per annum, free of income-tax, for the half year ending the 30th of June last. A scheme for such dividend will be presented to the meeting for adoption.

During the past half year the system of increasing the size of the mains has been continued in several parts of the district of the company, and the result is satisfactory to the directors.

The shareholders may rest assured that every attention will be given by the directors to the interests of the company.

The CHAIRMAN: Gentlemen, I am quite sure you will have observed that the directors' report on this occasion consists of a very brief statement, and no doubt its very brevity will have convinced you that there has been little of novelty in our proceedings during the past six months which your directors have felt it necessary to place before you. Perhaps it is quite as well that there should be but little novelty; we do not require repeated, and certainly not organic, changes in gas companies, and therefore the old saw, that "no news is good news," may be taken as correct, particularly in the case of such undertakings as these. The first paragraph of the report has informed you that the affairs of the company are in a satisfactory condition; and I think we may very properly say that they are so. I have given—and I am sure I may say for my colleagues, we have given great attention to the question of the accounts, and all those other points upon which the prosperity of gas companies are consequent, and I may truly say that I think the affairs of the Commercial Gas Company are in a most satisfactory condition. I may inform you, in the first place, that in reference to the cost of coals, we consumed during the corresponding half year ending June, 1857, a quantity equal in value to £26,433. In the past half year we paid only £23,746, so that we show a difference in the cost of coal for the two half years of £2687 in favour of the latter. This, no doubt, is a very satisfactory circumstance, and speaks well for the working of the half year. At the same time, it is impossible not to feel that probably next half year coals may be up again, and we may have to pay a very much larger amount than we do at present. I do not know, however, that our success is wholly to be attributed to the question of coals, though, no doubt, the carbonizing has been very successful. You are aware that at our last half-yearly meeting I told you we had increased the size of our mains throughout the district, or the larger part of it, and that has lessened the working pressure. Then, again, we altered a very important area of retort surface; in fact, we altered the principle of our retorts entirely, and that has also contributed to the satisfactory working of the last half year. With reference to the rental of the company, we say in the second paragraph of the report that that shows a steady increase; and when you hear what I now have to say on the point, I think you will agree with me that that statement is borne out by the actual figures. The rental for the half year ending June, 1857, was £38,348, while for the corresponding period of 1858 it was £39,038; so that you see there is an increase of nearly £700 upon the last half year's working. A higher average, too, has been obtained for our coke; and with reference to the sale of this article, I may observe that in the corresponding half year of 1857 the price we obtained was only 8s. 6d. This was a frightful price, but you know the circumstances under which we are placed with respect to the sale of coke. We are surrounded by other companies, all making coke in enormous quantities, and we, placed in the centre, have to contend with enormous difficulties in getting rid of this commodity. You know we must keep our works clear, and if we cannot get 10s. we must take 9s., and if we cannot get 9s. we must take 8s.; and the consequence of this state of things is, that in 1857 we only got 8s. 6d. for the coke we made. I am happy to say that for the half year just ended matters have been looking up in this direction also, and the price we have been enabled to realize is 10s. 3d.; so that, upon the whole, this has been one of our good half years. The entire profit realized has been £9167. 15s. 10d., and this will enable us to declare the dividend which for the last few years the directors have had the pleasure of suggesting to you, viz., at the rate of 6 per cent. per annum. This, no doubt, is very satisfactory, because the directors of a company so placed as ours is, must look at recurring half years with considerable anxiety. You know that we have not an available contingent-fund to provide against those accidents which gas companies alone have to meet, though I do hope before we leave this room to-day we shall have commenced a little reformation in this respect. I trust the proprietors will agree with me that, as the past has been an unusually good half year, we may put a little by to a contingent-fund—or, in point of fact, pay the debt we owe to that fund. I think you will remember that in the year 1848 it became a question as to the mode in which we should pay for our works. We had purchased the freehold of those works for £8900, and at one of our meetings the subject was discussed whether the necessary amount should be taken out of the capital or out of the contingent-fund, or a portion out of the amount of trade. You adopted this course—you decided that the balance of capital then standing to the company's credit, namely £4839, should be taken for the purpose; that the 3½ per cent. Consols belonging to the contingent fund should be sold, and that from the trade you would take £600 odd; and at that time you said that as soon as the company was in a position to replace that amount to the credit of the contingent-fund, it should be done. I therefore now call upon you to fulfil your pledge and the understanding we came to upon that occasion; and I am quite sure that, quite irrespective of that consideration, the great importance of having such a fund will induce you to agree with me that the money should be replaced. I may also mention——

Mr. BOX: Allow me to ask the date of the transaction to which you refer?

The CHAIRMAN: It was in 1848, when we purchased the freehold of our works, and I may say that it was before we were in receipt of 6 per cent. dividend. You know that the proprietors of this company went without dividends altogether for many years, for they were so anxious to establish the company upon a firm basis, that they said our first point must be to keep down the capital, and therefore we prefer to go without a dividend rather than take one when there is considerable doubt whether we have earned it. It was a very wise and prudent course to adopt, and I felt very proud of my proprietors that they were prepared to take so discreet a step rather than risk the future prosperity of the concern. Then, again, in 1854 we were obliged to take £3800 from the contingent-fund to make up the enormous losses we sustained in consequence of the frost of that year. You remember that there were 4000 tons of coal which we had within a short distance of our works, but which we could not get up, and we were obliged to purchase coals to be carted in, for which we had to pay something like 44s. a ton. That was a matter which of course caused us much uneasiness, but it was just one of those circumstances which enabled the directors to look with great satisfaction to the existence of a contingent-fund, and we were obliged to take, as I have said, £3800 from that fund to make up the loss; so that now we have actually to make up the sum of £7598, the whole of which ought to have been replaced long since. You know what was said at the last half-yearly meeting on this subject by an honourable proprietor (Mr. Graham), who is not present on this occasion. Mr. Graham made use of some very sensible remarks, as they appeared to me, about that contingent-fund. He said: "The contingent-fund would be, properly speaking, money laid aside for certain purposes, and ready for use when required. It appeared to him that, of the £6500 appropriated for such a fund, the company had actually only some £3774 in the Bank applicable to the purpose (that was a mistake of the honourable proprietor), and it ought to be explained to the shareholders that so much was invested in the funds and so much in the working plant of the concern. The chairman had talked of explosions; such things might happen, but what money had they in the funds to restore the works with? In his opinion, the capital of the company might be called up, to make the contingent-fund as large as possible. There was about £23,000 or £24,000 more to call up, and if that were done they would have a real contingent-fund to work upon, and if a gasholder did burst, they would be able to replace it and reinstate the works without borrowing money." Now, there was a strong feeling expressed on that occasion by the proprietors generally that the capital should not be called up, and in that feeling the directors sympathized, though they went a long way indeed with Mr. Graham in his remarks. We felt that if that were done, we should be paying 6 per cent. for money, and it would be, in point of fact, to use an old phrase, "robbing Peter to pay Paul;" therefore we said we will not ask the proprietors to adopt that course, but rather, when good half years come, recommend them to replace the contingent-fund. And now, gentlemen, I call upon you to redeem your pledge. That is the position of affairs at this moment; but I may state to you that the Act of Parliament under which we are incorporated specially authorizes, if it does not direct, your directors to set apart a portion of the profits before appropriating any to the payment of a dividend, to be applied to the contingent-fund. The 122nd section of the Act says, "Before apportioning the profits to be divided among the shareholders, the directors may, if they think fit, set aside thereout such sums as they may think proper to meet contingencies, &c." Now, surely, gentlemen, that is a very discreet provision if you have discreet directors, and I hope, therefore, you will be willing to fall in with the suggestion we now make with respect to the allocation of a part of your profits *after* the payment to you of a 6 per cent. dividend. I trust you will think we are good stewards and wise men acting in commercial life, and knowing what trade is and the special risks of gas operations, when we tell you that we have arranged that £1232. 6s. 9d. of the half year's profits shall go in repayment of the money borrowed from the contingent-fund to make up the loss which the company sustained in the purchase of coals in 1854, and for the amount drawn out to enable us to purchase the freehold of our works. Gentlemen, I believe there is only one other matter to which I need advert, and I only do so because I think you may expect that I should say something about it. It is with reference to the Metropolitan Gas Inquiry of the last session before a committee of the House of Commons. Now, gentlemen, I attended that committee, and it occurred to me (although I had at first objected to the constitution of that committee) that the honourable members who composed it approached the subject with an anxious desire to elicit the truth. Only one side—or, in fact, only a small portion of one side—of the question was heard; but although I was present from the commencement until the termination of those proceedings, not one word was uttered in my hearing which at all affected the Commercial Gas Company in any shape or way. Indeed, I am not aware that the persons supplied by the Commercial Gas Company are at all agreeing parties to the opposition which has been raised to the metropolitan companies; at all events, I may say with truth that we have received no notice of such opposition to our proceedings. Our consumers, we have reason to believe, are all satisfied; we have no complaints either of the quality or of the quantity of gas supplied by us; we have no complaints as to price; indeed, I should be surprised if we had, seeing that the Commercial Company are supplying gas at a lower price than any other company in London. In reference to that low price, I do not wish to take any special credit to ourselves for it, for I am free to admit that there are circumstances affecting the supply of gas by you which do not exist in reference to any other company. You are a consumers' company, and you were willing in the early stages of the company's existence to go without a dividend. You said: "Our desire is to place the company upon a sound basis, and we will for a while go without a dividend." The effect of that decision unquestionably was to reduce the capital of the concern. Then, again, in 1854 we purchased our mains at less than £5 a ton, and we also purchased the British Company's works.

Mr. LULHAM: For how many years did the proprietors go without dividends?

The CHAIRMAN: I think for six years they were without a farthing, and I remember a noble speech made in this house by an honourable proprietor on the subject, in which he said—"Gentlemen, we do not care; our object is to establish our company upon a sound basis; we wish to make a Consol company of it, and we must be willing to sacrifice our present interests for our future benefit." I hope the time may come when we shall fully realize that advantage. I am not prepared to say that we are always to pay 6 per cent. dividend only, but, gentlemen, I would rather do that, or even take 5 per cent., if I thought a larger amount was not fairly earned. And now I think I have stated all that I have to say with respect to the past half year's operations. As I said before, no complaint was made before the committee of the House of Commons about your company in any shape or way; whenever any such complaint shall be made, I have no doubt your directors will be able to meet it. We know that we have done our duty to our shareholders on the one hand, and that at the same time we have not forgotten our duty to the consumers; and if we can show that, there is that proud and honourable feeling in the breast of every Englishman which will not allow a company to be sacrificed to satisfy a popular outcry. I speak not for other districts, but for my own, and having done that, I shall move, "That the report and accounts now read be received, adopted, and entered upon the minutes."

Mr. RHODES: I second the motion, and would just remark that the clause in the Act of Parliament which you have read does not specify what amount you are to raise as a contingent-fund.

The CHAIRMAN: That is a question entirely in the discretion of the directors.

Mr. RHODES: What amount do you contemplate raising?

The CHAIRMAN: In answer to that, perhaps it would be better to read the scheme which the directors have prepared. It is as follows:—

Scheme for Dividend.

Balance		£9167 15 10
Contingent-fund	£1232 6 9	
Interest on debentures	302 0 0	
Dividend	7633 9 1	
		£9167 15 10

Mr. RHODES: Respecting the mains you have laid during the last half year, I suppose you are enabled to inform us that you have reduced the leakage thereby?

The CHAIRMAN: I think as respects the last half year, I am not enabled to inform you of any reduction in that matter. Our main-laying recently has consisted of taking up old mains and replacing them with larger ones.

I do not think that at this moment we are in a position to say what the precise effect is, but I have no doubt in the world that that is the effect.

Mr. RHODES: Many of the mains of the British Company to which you took would want replacing with new ones, and I hope you have been into that district, working it up.

The CHAIRMAN: That is just what we are doing.

Mr. WILSON (deputy-chairman): I believe there is a reduction in the leakage of from 15 to 20 per cent.

Mr. BOX: I have been very much pleased to hear many of the remarks which the chairman has made, especially those in reference to the contingent-fund; but some of his remarks were calculated rather to lead astray than to afford satisfactory information to the meeting. He made his calculations and comparisons as to the working results of the company from the money price of coal, which is, I think, a very delusive mode of doing it. If he would give us from time to time the quantity of coal used, and the results obtained from that quantity, I think it would be much better. That our affairs have improved, I am happy to think. I have worked it out, and I find that, comparing this half year with the corresponding half of last year, the profit we have made is just 10 per cent. better upon the quantity of coals consumed; and that being the case, I am sure every proprietor will leave this room perfectly satisfied with the attention which has been given by our engineer to our affairs. There is one thing, however, which I do not like, and I had prepared a resolution upon it. I refer to our capital account; but I am afraid that the suggestion of the chairman, if adopted, will clash with it. Our capital account does not please me at all, and never has. I have spoken about it on several occasions, but I have never before prepared a resolution upon the subject.

The CHAIRMAN: I do not, of course, know what you are going to propose, but you will allow me to say that, if it is anything which would involve an organic change, it is a matter upon which you must give notice.

Mr. BOX: There is nothing in the Act of Parliament which requires that I should.

The CHAIRMAN: I believe that there is, but whether or not, I put it to you whether it is not a wise and proper course for you to adopt?

Mr. GRAY: I think it is not at all a desirable thing for Mr. Box to bring before the meeting a resolution without giving previous notice of his intention to do so. I do not know whether the Act of Parliament requires it or not, but it is a far more convenient mode of proceeding.

Mr. BOX: My friend does not act upon that principle in other companies.

Mr. GRAY: Unless it is in reference to the augmentation of the salary of an officer, it is a principle I always act upon to give notice of my intention to propose a resolution.

The CHAIRMAN (as the meeting began to exhibit signs of impatience at the course adopted by Mr. Box) appealed to that gentleman not to proceed.

Mr. BOX, as usual, refused to listen to the advice of the chairman and the loudly-expressed opinion of the meeting, and made a long, rambling, and incoherent statement respecting a discrepancy which he alleges he has discovered between the actual amount of the paid-up capital of the company and the amount upon which the dividends are paid. At former half-yearly meetings it has been distinctly pointed out by the chairman and secretary that his calculations are based in error; but though the proprietors on past occasions have unanimously admitted the correctness of the accounts, Mr. Box refuses to be enlightened. He has discovered a mare's nest, and he is determined to make the most of it, and to inflict upon his brother shareholders the misery of listening, at a fearful sacrifice of time and patience, to a repetition of arguments which, even if founded in truth, would be utterly unintelligible. It was in vain for the meeting to protest against his proceedings, or for the chairman to insist that the honourable proprietor was out of order in proposing a motion for rearranging the capital account, on the question for adopting the report; and after a scene of considerable confusion, it became necessary to put it to the vote of the meeting whether Mr. Box should any longer be heard. The result was that Mr. Box was compelled to resume his seat.

Mr. GRAY: I have the most entire confidence in the integrity and ability of our worthy directors, but as a large shareholder, and being also connected with other companies, I think it my duty to call attention to a circumstance of great importance. It appears that, taking the rental of this half year and comparing it with that of the Christmas quarter, there is an addition of some £300 or £400. I should like to know the number of tons of coal carbonized this half year.

The CHAIRMAN: I can only say that, as you know chairmen of gas companies are often placed in positions of difficulty, I should have hoped that my worthy friend, for whom I have the greatest possible amount of respect, for he has often been of great use to me in gas operations, and whenever I want a good opinion upon gas matters I know I can go to him and ask it, for he has never withheld his kindly advice when asked, and when I have had an opinion from him it has been an extremely valuable one—I am sure I hope my worthy friend will excuse me for saying that I am surprised that he, as a gas director, and knowing the position in which gas directors are placed at this time, should have asked such a question. He knows perfectly well that those who are opposed to us are looking on, anxious to find a stick with which to thrash us, and he is going to ask us to give them that stick, and place us and the shareholders in a position likely to damage our interests most materially. Now, I cannot say that I will not give my friend the information, but I put it to him whether he will press for it.

Mr. GRAY: No, I will not. Gentlemen, my friend has an objection to answer the question, and there is a great deal of point in what he says. I need hardly assure him that my object was not to damage the interests of the shareholders; and therefore, without going into detail, this is a matter upon which I can communicate with the directors. But there is another point. The rental you receive very inadequately represents the quantity of coal carbonized; and with regard to the yield of your coals, it is much less than the yield of almost any other company. How it arises I cannot tell. I know the average yield is 7750 feet, but the average of yours is not more than 6750 feet for the last half year. In the next place, you appear to pay a much higher price for your coals than other companies do. I want to know what canal dues you have?

The SECRETARY: 16d.

Mr. GRAY: No lighterage?

The SECRETARY: No, that includes lighterage.

Mr. GRAY: That may account for the difference between you and other companies who are not subjected to that charge. Adding that to what they pay brings it to about the same thing.

The CHAIRMAN: I may just say the average price is 16s. 1d.

Mr. GRAY: It is far from my wish to raise objections in this or in other companies. We have been exposed to a great deal of obloquy for a considerable time, but, as the chairman said, I am perfectly satisfied that the committee of the House of Commons, from the evidence which has been laid before them, when the companies come to bring their case forward in reply, will be ashamed of the people who have promoted these charges against us. I am quite sure that all the companies are prompted by a just and honourable feeling towards the public at large. Every man who embarks his capital in an undertaking has a right to receive a fair profit for his investment, and the gas companies of the metropolis have no other wish. It would be very ill policy on their parts to set themselves against their consumers—they must act in harmony with them; but, on the other hand, when the consumers make demands of an unreasonable and injurious character, it is the duty of the companies, and they must resist them.

Mr. BOX again attempted to speak, and created considerable interruption by persisting in doing so.

Mr. LEWIS: I put it to the proprietors whether they will permit any man, let his station be what it may, to rise against the chair? If you do, there is an end to all order in our meetings.

After some delay, the CHAIRMAN succeeded in putting the resolution for the adoption of the report, which was unanimously affirmed.

The CHAIRMAN then read the scheme for dividend, and proposed "That a dividend at and after the rate of £6 per cent. per annum, free of income-tax, for the half year ending the 30th of June last, be now declared, and that the same be payable at the company's offices, Stepney, on Monday, the 11th, Tuesday, the 12th, and Thursday, the 14th days of October, and on every subsequent Monday, Tuesday, and Thursday, until the 8th day of November next, between the hours of twelve and four, and afterwards on Mondays only, in every week, between the same hours."

Mr. RHODES seconded the resolution, which was put and carried.

The CHAIRMAN read the engineer's report as follows:—"I beg to report that the works are in a satisfactory state, and in good working order."

Mr. BOX requested that in future the revenue arising from the sale of coke, tar, and liquor be stated in the half-yearly accounts separately. He complained that there was a discrepancy between the quantity as stated in the the profit and loss account and that which he had ascertained to have been produced at the works.

The CHAIRMAN assured him that he was wrong, and suggested that he was confounding the quantity produced with the quantity sold.

Mr. BOX insisted that he was right, as the figures he obtained at the works were given him by the chief officer of the company.

The SECRETARY distinctly denied that he had furnished Mr. Box with any figures on the subject.

The CHAIRMAN said it was not fair that the time of the meeting should be wasted on a question of the want of agreement between the audited accounts of the company and some figures which the honourable proprietor had obtained in some way or other at the works, and which were as likely to be wrong as right.

Mr. BRATT advised Mr. Box to go down to the works again, when he might satisfy himself that he was in the wrong.

Mr. BOX, however, was not to be shaken off so easily, and much time was again wasted by him in arguing the point, which he did amidst general expressions of impatience.

Mr. LULHAM then said: Gentlemen, I have a more pleasing duty to ask you to perform than to listen to Mr. Box—it is, to pass a vote of thanks to the directors. I am happy to have an opportunity of proposing it for the manner in which they have come out to-day in restoring our contingent-fund. Of all things in the world a gas company should never be without a contingent-fund. I regard this as a step in the right direction, and I am pleased to see it. I thank the directors from my heart, and hope you will agree with me in giving them a cordial vote on this occasion.

Mr. RHODES seconded the motion, which was unanimously adopted.

The CHAIRMAN, in acknowledging it, said: It is really quite refreshing to attend this meeting, because, though we see so much apparent feeling, we know it is all in fun.

Mr. BOX: No, sir, it is not.

The CHAIRMAN: I can assure you no one is more delighted to see Mr. Box enter this room than I am. All dry proceedings should be relieved to a certain extent, and the dry gas process on this occasion has been relieved by Mr. Box.

A vote of thanks to the auditors terminated the proceedings.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of this Company was held on Wednesday last, the 6th instant—T. B. SIMPSON, Esq., in the chair.

The notice convening the present, and the minutes of the previous, meeting having been read,

The SECRETARY (Mr. Livesey) read the half-yearly report of the directors, which was as follows:—

It is very gratifying to the directors to be enabled to submit, for the information of the proprietors, such a statement of the progress and condition of the company as will, they hope, meet with the approbation of this meeting.

During the half year since the meeting in April last there have been erected on the works two additional store-rooms, capable of holding 2000 tons of coals. There have also been laid down in several parts of the district larger mains, in lieu of smaller sizes, from which the directors anticipate they will be able to meet any additional demand for the company's gas during the winter.

The proprietors, no doubt, already know, through the medium of the public journals, that the House of Commons, in the latter part of the last session, appointed a committee to inquire into the price and quality of the gas supplied by the several metropolitan companies, and that the committee, after a few sittings, adjourned the inquiry and further consideration of the question until the next meeting of Parliament, when in all probability the same committee will be re-appointed. The directors, however, have no apprehension that any regulations will result therefrom that will materially interfere with the interests of this company.

By the accounts which will be submitted to the meeting it will be seen that the rental for gas and the receipts for products, &c., for the half year to the 30th of June last amount to £32,020. 8s. 3d., and the expenditure for the same period to £22,541. 7s. 4d., leaving a balance of £9479. 0s. 11d., which the directors recommend should be appropriated by the payment of a dividend of 3 per cent. for the half year and a bonus of 10s. per share, and by placing the balance to the credit of the reserve and wear and tear accounts.

It gives the directors much pleasure to inform the proprietors that the gas rental continues steadily to increase; that the receipts for coke are improving; that the plant of the company is in the best working condition; and that the establishment generally is conducted to their entire satisfaction.

In conclusion, the directors beg to report that they have taken a lease, on favourable terms, from the Surrey Canal Company, of a long slip of the canal bank, in continuation of the land already in the company's possession, and for the same time as the existing leases. This will enable the directors considerably to extend the manufacturing part of the works whenever the increase of business may require it.

The CHAIRMAN: Gentlemen, the report states all, or nearly all, that we have to say to you—indeed, I do not think that there is any one thing to which I need call your attention: nor, on the other hand, have we anything to ask from you in the way of advice in reference to our proceedings. We go on very quietly and steadily, and I think both we and yourselves have reason for the utmost satisfaction with the present position of our affairs. I might, perhaps, be expected to offer a remark, but I do not think it necessary, as to what has taken place in the committee of the House of Commons. Nothing has there transpired which appears likely at present to affect the companies

generally. Two or three persons have come forward and given evidence of a particular kind, but I think there is nothing which would justify us in supposing that the committee will adopt any stringent regulations such as will interfere with us. I might state to you that, in reference to our own proceedings, we have taken additional ground upon what we believe to be advantageous terms. We felt that if we did not take it as we did, the time might come when we should not be able to increase our accommodation to meet the requirements of our trade, and therefore, as the opportunity offered, we thought it was our duty to take advantage of it; and I think we shall meet with your approval in what we have done. And now, gentlemen, looking at the whole state of your affairs, and remembering how much you are indebted to our excellent secretary for the support and co-operation he affords your directors in the management of the company, I think it is not too much for us to ask you to give him £100 on this occasion. In point of fact, your directors cannot speak too highly of Mr. Livesey's services, and of the attention which he bestows in promoting the prosperity of the company; and therefore it would be only wasting your time by attempting to enlarge upon his merits. At present, therefore, I will content myself by moving that the report of the directors now read be received and adopted.

The motion having been duly seconded, was unanimously adopted.

The CHAIRMAN: I now move from the chair, that £100 be presented to Mr. Livesey for the attention which he has given to the affairs of the company.

The motion was cordially adopted.

The SECRETARY said: Gentlemen, I thank you most sincerely for the kind and handsome way in which my name has been introduced, and for the very liberal grant you have just voted me. I hope, so long as I continue in your service, you will never have occasion to regret it.

The following statements of accounts were presented and read:—

Dr. WORKING THE ESTABLISHMENT, FOR THE HALF YEAR ENDED JUNE 30, 1858. *Cr.*

To amount paid for wages	£3,638	14	6	By gas rental—			
Ditto for salaries	1,178	1	0	March 31	£16,137	8	0
Ditto to directors and auditors	401	5	0	June 30	9,089	7	2
Ditto for lamps and lighters	1,160	9	3			25,226	15	2
Ditto for rent and taxes	601	3	7	Sundry products for the half year		6,158	14	6
Ditto for purifying material	285	11	9	Interest and rent of meters, &c.		804	7	9
Ditto for sundries	910	3	8					
Coals carbonized	9,705	13	10					
Wear and tear of retorts	505	15	4					
Main-pipes laid and repaired	1,261	3	4					
Meters fixed and repaired	902	10	2					
Service-pipes laid and repaired	291	11	10					
General stores used	490	18	3					
Bad debts and allowances	205	9	8					
Extension of coal-stores, &c.	1,172	5	4					
Balance	9,479	0	11					
	£32,189	17	5			£32,189	17	5

Dr. BALANCES TO JUNE 30, 1858. *Cr.*

To capital	£120,000	0	0	By amount expended on works, &c.			£101,674	0 3
Unpaid dividend account	109	7	5	Stock of coals	£2,582	11	9	
Amount due to sundries	1,597	12	8	Ditto of coke, &c.	62	15	0	
Ditto paid in advance for gas	202	0	8	Ditto of retorts, &c.	1,286	9	6	
Reserve-fund	2,709	3	8	Ditto of main-pipes	945	18	6	
Wear and tear account	1,350	6	2	Ditto of service-pipes	235	4	9	
Working ditto	9,479	0	11	Ditto of meters and fittings	711	9	10	
				Ditto of general stores	523	0	11	
						6,347	10	3
				Amount due for gas	£11,614	9	1	
				Ditto for coke, &c.	607	18	7	
				Ditto for sundries	222	11	6	
						12,444	19	2
				Cash at bankers	£14,970	18	1	
				Ditto in hand	70	3	9	
						15,041	1	10
	£135,507	11	6			£135,507	11	6

On the motion of the CHAIRMAN, it was resolved that the accounts now presented be received and entered upon the minutes.

A PROPRIETOR inquired whether any interest was received upon the reserve-fund.

The CHAIRMAN said there was, and that it was carried to the account of profit.

The SECRETARY explained that it was included in the item on the credit side, "Interest and rent of meters." It was £71. 19s. 2d. for the half year.

The CHAIRMAN was glad the honourable proprietor had called attention to the point, as it afforded him the opportunity of stating that last year the directors had found it more beneficial to employ the amount in the business; this year it had been placed out at interest in India Bonds, and in future accounts a larger amount would appear to their credit.

A resolution adopting the recommendation of the report, and declaring a dividend at the rate of 3 per cent. for the half year, with a bonus of 10s. per share, was then agreed to.

On the motion of Mr. EDGINGTON, seconded by Mr. COXHEAD, the cordial thanks of the meeting to the governor and board of directors was unanimously passed.

The CHAIRMAN, in acknowledging the vote, said: Gentlemen, it is very satisfactory to us to find that we have merited your approbation, and I have only to assure you that, so long as we have your confidence, no exertion on our parts will be wanting to secure the interests of the company and your approval.

The proceedings then terminated.

ANGLO-ROMANO GAS COMPANY.—The Ordinary Half-Yearly Meeting of this Company was held at the London Agency, New Broad Street, when the report of the Committee of Surveillance was read and the accounts passed, after which the *gérant*, Mr. James Shepherd, made a very satisfactory report of the progress of the undertaking. Upon the proposition of the *gérant*, a dividend of 4 per cent. for the past half year was declared, payable inRome and London on and after the 1st of November next.

RAMSEY.—Tuesday last being the day fixed for the commencement of burning gas, the mains were accordingly charged. For the first hour or two there was a little stir and anxious call for the several gas-fitters who had been employed, as it was found there was some little escape from trivial crevices in the internal fittings, which alarmed the householders; these were quickly corrected, and the town presented quite an animated appearance. The shops are well lighted, and the gas appeared to be of very good quality, and everybody seemed to not only be satisfied but quite pleased. There has not yet been an opportunity of any public expression of opinion, but the testimony of every one seems to be in the highest degree congratulatory to the engineer, the contractors, and all concerned in the works. Mr. Church, of Chelmsford, is the engineer; Messrs. Headley and Manning, of Cambridge, the contractors for the gas-works; and Mr. Isaac Bateman, builder, of Ramsey, the contractor for the buildings. It is most satisfactory to say that not a single mishap of consequence has occurred during the whole process of the works, and everything seems so well done that there does not appear to be the semblance of complaint from any party; and if the public will but continue to burn as liberally as they began the first night, we judge the company will soon be able to supply them at a cheaper rate, and yet be able to pay a reasonable dividend.—*Cambridge Independent.*

PADDON'S REGULATOR FOR STREET LAMPS.—The question of public lights is one of gradually increasing importance to gas companies, and in the regulator recently patented by Mr. Paddon, of the firm of Paddon and Ford, the chief peculiarity consists in the adaptation of magnetic attraction to the compensation of the diaphragm, in lieu of the usual lever and other means of so doing. A comparative simplicity of detail is the consequence, which promises well for its efficiency. The advantages claimed for it are, the maintenance of any given pressure and consumption at the burner, and a saving of from 20 to 30 per cent. of the ordinary consumption, without diminishing the amount of light. This advantage will be shown in the decreased amount of unaccounted-for gas; a reduction of pressure in the mains, especially during the quiet hours of the night; a saving in the cost of repairing lamps; and a security against the uncertain adjustments of lamplighters, which in so many instances lead to disputes with parochial authorities. The price of this regulator is reasonable, and its real value can now be ascertained by any one.

WELLINGTON COLLEGE, BERKSHIRE.—This splendid national institution is rapidly approaching completion, the present intention being to have everything in readiness for the reception of students on the 1st of January next. It has been determined to light and ventilate the building by gas, and Mr. Geo. Walcott, of London, has been appointed engineer and contractor for erecting gas-works for the exclusive use of the college, and also to fit up the entire institution for gas. The number of lights in the college will be about 240. The gas-works, including a dwelling-house for the future gas-maker, are situated about 700 feet from the college.

GUM-LEAF GAS.—The *Melbourne Argus* gives another and more specific statement, showing the comparative yield of a few samples of coal and of gum leaves, branches, and logs experimented upon, from which it will be seen that a ton of gum leaves yield more cubic feet of gas than a ton of native coal; wherefore, it is reasoned, gum-leaf gas will supersede coal gas in the Australian towns.

	Cubic Feet per Ton.
English Boghead cannel coal	14,000
,, Lesmahago ,, ,,	10,500
,, Wigan ,, ,,	9,500
,, Newcastle coal	8,500
Sydney A. A. Co. coal	6,500
Tasmanian Fingal coal	5,700
,, Mersey coal	4,600
,, Douglas River coal	3,500
,, Schouten Island coal	2,500
Green gum leaves and branches, half dry	11,700
Dry gum leaves and branches	10,500
Outside slabs, gum logs	7,200
Small green gum branches	6,300

The towns into which the gum-leaf gas has been introduced are Kyneton, in Victoria, and Hobart Town, in Tasmania; Mr. Praagst having obtained a patent of oil from the trees named in Victoria, whilst the Hobart Town Gas-Works have been engaged in making experiments. The gas obtained from the new material burns steadily and brilliantly, but is inferior to that obtained from the Australian Agricultural Company's Sydney coal, and even the latter is so inferior as to require a small admixture of English Boghead coal to give it the proper illuminating power; it is thought, however, that by doubling that proportion of Boghead coal when using the new material, gas of good illuminating power could be obtained. Although a Victorian patent has been secured by Mr. Praagst, his claim to the honour of the discovery has been disputed in a paper read before the Pharmaceutical, and it it asserted that many years since Sir J. F. Palmer (the present President of the Legislative Council) had employed himself in distilling oil from the native gum-tree leaves, but there is no evidence that he succeeded to any useful extent. A sample of oil distilled from the Eucalyptus leaves was exhibited long since in a public collection of the natural and artificial productions of the colony of Victoria, and afterwards sent to the French exhibition of 1855: a bottle has since been sent to the Botanic Gardens, Kew.

[ADVERTISEMENT.]

MANCHESTER CORPORATION AND ITS GAS-METERS.

To the Mayor, Aldermen, and Councillors of the City of Manchester.

GENTLEMEN,

I appeal to you as Englishmen, and as dispensers of justice, for a fair and dispassionate hearing, in reply to the report from the gas committee presented at the last meeting of the council, and to the assertions made to my prejudice in the course of the discussion which followed. I am sensible that the contest is an *unequal* one, and that a private individual is no match for a powerful body like the gas committee of Manchester; but, as I feel strongly that I have truth, reason, and justice on my side, and that I have the support and countenance of the public, I will not shrink from an exposure of the misrepresentations and sophistries which have been directed against me.

Having, in conjunction with Mr. Goldsmith, invented what the most eminent gas engineers have pronounced to be the nearest approach to perfection yet made in a gas-meter, and the patent for which now belongs to my firm of Crosley and Co., I submitted it, more than two years since, to the comptroller of your gas-works, and in December of last year to the gas committee; and I believe, after canvassing its merits under every point of view, most of the members of the committee were convinced of its superiority, and were favourably disposed towards its adoption. I soon discovered, however, that there were influences at work which counteracted all my exertions, and at last Mr. Cleminshaw frankly told me—after a meeting of the committee held on the 18th of December last, at which it was resolved that consumers who wished, might use my meter—that he should (notwithstanding what had been said to me by the committee) continue to recommend consumers to purchase meters of the make which were then sold at the gas-office rather than mine, even though they might express a wish to have mine in preference. After such a declaration, it of course became hopeless to gain Mr. Cleminshaw's support, and having reason to suspect from remarks which had fallen both from him and from Mr. Bardsley, that the meters were overfilled with water, I determined to see how the fact was, by personal examination of a number of meters in use in the town.

I submitted the results of my inquiries to the gas committee in an official report, dated January the 15th of this year, but of which no formal notice has been taken, unless the subsequent resolution, which abolishes any personal interest which Mr. Cleminshaw might possibly before have had in the meters being overfilled, is to be accepted as evidence that the gas committee had become aware of the false position in which the payment of a chief officer by a per centage of, I understand, 12s. 6d. per £100 on the amount of gas sold had, under such circumstances, placed them. A sub-committee was, indeed, appointed to consider my observations and report thereon to the general committee, but as yet no such report has appeared before the public. I attended a meeting of that sub-committee on the 19th of January last, when the chairman made a very violent and ungentlemanly attack upon me, for the personal remarks which he alleged I had made upon Mr. Cleminshaw in my report of the 15th of January; and, with a view to show their injustice, he quoted a report by that gentleman to the committee, which spoke favourably of our patent meter, *and recommended its adoption.* It would appear from this circumstance, therefore, that the gas committee had before them some means of arriving at a conclusion on the subject, and that, *not* unfavourable to me, nearly nine months ago; and it is inexplicable what can have caused the subsequent delay, although it is rather a suspicious circumstance that Mr. Cleminshaw's report cannot, as I have been told by members of the council, now be found, or, at least, that they cannot get a sight of it; whilst other members tell me that it is now designated as only a memorandum for the private guidance of the sub-committee, and not a document on the minutes. But whatever may have been the cause, the matter *was hushed up*, and probably nothing more would have been heard about it, had I not, nearly six months later than the date of my report, repeated some of its statements before a parliamentary committee, and consequently then given a publicity to that part of it, which compelled the gas committee at length to break silence, which they did by *confining their defence to* the charges contained in *the evidence given in London, without alluding to other facts not less damnatory disclosed in my report*, and which document, therefore, virtually still remains ignored.

That committee admit in their report to the council, and in the observations made by Mr. Alderman Shuttleworth in presenting it, *the truth of all I have alleged in my evidence* with respect to the great bulk of the meters now in action in Manchester; but an attempt is made to *evade* the real question at issue. "The possibility of OVERFILLING the meter in general "use is well known," says the report; but, says Mr. Alderman Shuttleworth, "the meter we use is constructed in such a manner that there is a com-"pensating principle to meet the irregularities incident to the meter from "the evaporation of the water;" and then he goes on to explain this ingenious "compensating principle," *which is a mere delusion*, and consists absolutely in nothing more or less than the toleration of a range of error of 2 *per cent. against the consumer* in the original adjustment of the meter *at the water-line*, without reference to the overfilling which I pointed out, and of which I complain. But I can tell the worthy alderman that, in spite of his delicately-"compensating principle," the consumer may be defrauded to the extent of 60 per cent. by overfilling many of the 3-light meters, while the supplier of the gas may only be defrauded to the extent of 5 or 6 per cent., with the full number of lights on, by drawing off the water *below* the adjusted level, as I stated in my evidence before the parliamentary committee. He really either does not understand the question, or else he is trying to mislead the council and the public, for I positively deny that the Manchester meters are compensating ones, or have any pretence to being so, in the sense understood by a compensating meter; indeed, I have in my possession a 3-light meter of the same pattern and make as those for which the worthy alderman has such an affection, and which he states possesses his "compensating principle," but which, nevertheless, will register 64·47 per cent. more gas than is actually consumed when overfilled, and only 5·30 per cent. less, when underfilled, to such points in each case as not to interfere with the passage of the gas. To judge from the alderman's observations, as reported, I doubt very much whether he understands what his apparent idea of "compensation" really is; and I may therefore, as a meter manufacturer, tell him that it resembles, in some respects, the adjustment of a common watch as compared with a chronometer. To obtain mathematical accuracy would require not only a long course of adjustments, but uniform temperatures, and involve a useless waste of time; so that, by common consent, it has been agreed to consider a meter which registers within 2 per cent. *more* or *less* (not always 2 per cent. *more*, as the alderman seems to want it) than the true quantity at the regulated water-line as being sufficiently correct, for all practical purposes; but it is a *delusion* to talk about *this* 2 per cent. being any protection against overfilling, or having anything to do with it. The person whose duty it is to keep the meter charged, really holds the key, and has it in his power to determine whether the charge for the year's gas shall be the correct amount, or a considerable sum in addition. The matter may be *mystified* in any way the gas committee like, but the gravamen of my report and evidence lies *here;* and if the gas consumers of Manchester should be told that they also hold a key, and may retaliate by *drawing off* water *below* the proper level, and thereby obtain more gas than will be registered, we might witness a state of things which in no case would be creditable to either party. Mr. Alderman Shuttleworth says "they had done the only thing "open to them, namely, *to select the best meter.*" He would have been more accurate had he said *they had selected that meter which would bear the largest amount of overfilling, and register the greatest quantity of gas, without regard to the honesty of the measure or the interest of the consumer*, for such is practically the result, however honourable their intentions may have been. [See my evidence before the committee of the House of Commons on the 29th of June last, reported in the JOURNAL OF GAS LIGHTING of the 6th of July, 1858, page 414, col. 2, where it will be seen in the table of experiments upon sundry 3-light meters of different makers, that the one marked under the letter "A" *was liable to a very much greater range of error against the consumer than any of the others*—and *that* is the one used generally in Manchester.]

I need not remark further upon the imperfections of the meters patronized by the gas committee, nor add anything to what Mr. Alderman Shuttleworth says as to "the importance and desirableness of introducing as "perfect a meter as it was possible to obtain." Backed by my own experience and the opinion of the highest authorities on the subject, I thought that in presenting a meter which registered *accurately* the gas consumed, and ceased to transmit gas when it was either overfilled or underfilled, I had at least accomplished one great step in advance. I did not see that Mr. Cleminshaw's interests were jeopardized (if they were so), or that the gas committee would *sacrifice me to screen themselves.* I have been told that I took a wrong course, and that I should have flattered the committee and the officials, instead of pointing out their errors; but my advisers were perhaps not aware that, for several months prior to January in this year, I used my utmost endeavours, by courteous and conciliatory means, to obtain a fair and impartial trial, and that I did not resort to vigorous measures, till I had found my former efforts were unavailing; but whatever difference of opinion may exist as to the *modus operandi*, it does not at all touch the points which have brought me into collision with the gas committee. I have searched in vain through the reports of the last council proceedings for any confirmation of Mr. Simpson's assertions at the previous meeting, that the water-line of my meter was almost as variable as in other meters. But Mr. Councillor Rumney called at the gas-office, in accordance with the public invitation given by Mr. Simpson at the council meeting, to witness, if possible, a verification of his remarks by experiments; but instead of being so gratified, he was told by Mr. Cleminshaw that he (Mr. C.) *was not answerable for the statements of Councillor Simpson*, who it is well known is the deputy-chairman of the gas committee. I do not venture to affirm that the patent meter is absolutely and mathematically invariable, any more than a rod of metal a yard long at one temperature, would be mathematically the same at another temperature; but I do say, that when subjected to the ordinary treatment of *such instruments*, it approaches nearer to perfection than any other meter yet offered to the public. This perfection, however, can only be obtained at an increased cost, and in this respect the public are the best judges of their own interests. On a 2-light meter the excess is heavy, because it is the one on which the sharpest competition exists between makers; and it is unfair in Councillors McGill and Simpson to select this as any basis of comparison as to relative prices of meters in general, without at any rate, at the same time, having the candour to tell the council and the public, who purchase them, that the one they use in Manchester and base their comparison upon, has the measuring-wheel, &c. &c. (the most important part of the meter), made of *very inferior materials for the purpose*, and not such as is generally used in the trade, or like that used for other sizes of meters, or even those of the same size, made by other firms. This possibly may be *a secret* not known to the gas committee even, but as a comparison as to prices has been made, I ask Mr. Cleminshaw, through you, whether he is not cognizant of that fact? I gave him a hint that I was aware of it, on the 18th of December last. The extra expense of repairs of these inferior meters, of course will fall upon the consumers, who are obliged to purchase them from the corporation, and afterwards maintain them in repair; so that ultimately the low priced meters will be the most expensive to them, quite irrespective of the question of excessive registration from overfilling. On a 3-light meter the excess is only 5s. 3d., or about 16 per cent., and descends to about 8 per cent. on the larger sizes; and, after all, a month or two's saving, from the evil effects of overfilling the meter with water, may cover its increased cost.

Alderman Shuttleworth, in his speech, sounds his own trumpet, and claims credit as chairman of the gas committee, for that which others are not willing to accord to him, or it. His words are, "That *perhaps* the "Manchester gas committee might claim for itself a credit in this respect "which could not in an equal degree, perhaps, be claimed by any other gas "establishment in the country. . . . . That establishment had been ex-"clusively the possession not of private proprietors, but of the public at "large, and therefore the gas committee had not had *such* motives as it might "be supposed influenced private establishments in sanctioning a form of "meter, or a course of management in connexion with meters, that might pos-"sibly *increase the dividends and profits* of those private establishments;" and yet we find private gas companies adopting in very many cases, and using exclusively, meters not liable to be overfilled to the prejudice of the consumer, while those used in Manchester are liable to that evil *to a greater extent than those of any other make.* My attention has been called by a member of your council to a speech made by Alderman Shuttleworth at the council meeting on the 3rd December, 1856, as reported in the Manchester journals of the 6th same month, wherein he alludes to the evil of meters being so constructed *in another town*, where (he quotes) "the range "of error was found to be 19 per cent., which was principally against the "consumer." What was the object of this speech and quotation? He did not tell the council that those used in his own city, where he was chairman of the gas committee, were capable of recording to the extent of 60!! per cent. against the consumer!!!! Was it because he was really ignorant of that fact (although he has been at the head of the gas committee for so many years)?—if so, I then submit that the alderman ought to thank (as two members of the gas committee did at the meeting), instead of abusing me, for teaching him something he did not know before, but which, in his position, he ought to have been aware of and remedied long ago.

I will touch as briefly as possible upon the jesuitical attempts made to

impugn the accuracy of my experiments, and the inferences to be drawn from them. I never refused to give the gas committee the fullest information relative to where those experiments were made. When asked to do so, I produced my memoranda, and was preparing to give the *details*, but the conversation took another turn, and the inquiry was not subsequently renewed. I have witnesses in each case, and no evidence as to the state of the meters *after* January 15 last, when I made the report to the gas committee *which they appear to have suppressed*, can disprove the evidence I am prepared to offer in corroboration of it. That document, of course, produced considerable consternation amongst the officials, who, according to Mr. Alderman Shuttleworth's statement, had been instructed to take "great "care that the meters were not overfilled," and immediate steps would naturally be taken by them to make every trace of their alleged neglect disappear. But, if any doubt exists as to whether the meters generally have or have not been habitually overfilled, the matter may be conclusively settled by taking off the fronts from the high-spouted meters of the size of which the largest number is in use, and ascertaining whether the lines of oxidation formed by the water are, or are not, above the level of the run-off plug or adjusted water-line. The point is easily determined, and I challenge the gas committee to make such an investigation in my presence, and that of independent members of council *not* on the gas committee. But, argues Mr. Alderman Shuttleworth, "even admitting all Mr. Crosley states to be true, "and excluding the two worst cases, which may admit of explanation, the "mean error is only 2 1-7th per cent., or a mere modicum beyond the com-"mercial limit" of error. This statement is a gross misrepresentation of the facts. In my report and in my evidence I stated that the twenty-four meters I found to be overcharged were so, ABOVE *the level of the run-off plug*, and consequently *in excess of any tolerated error of* 2 *per cent.*, which, I suppose, is the ingenious "compensating principle" so glowingly eulogized by him (which 2 per cent., by-the-bye, Mr. Shuttleworth appears to claim as a regulation *always against the consumer*, whereas the understood rule in the trade is, that a meter shall be passed if within that range *either* way); and my belief is, that meters *uniformly and designedly* constructed to register 2 per cent., or any other amount, *against the consumer* in the way Mr. Shuttleworth alludes to, would be as illegal as scales weighted with 2 lbs. at the goods end of a beam, when 100 lbs. are at the other, with a view to deprive the customer of that weight in every 100 lbs. supposed to be sold to him. But why, I ask, should the two worst cases in my list be excepted? as the following certificate from Mr. Barlow (the eminent gas engineer) proves that the extent to which I state that I discovered and reported certain meters to have been overcharged, and working untruly, is within the limit in that way, to which they are liable:—

(Copy.)

"*Manchester, Aug.* 23, 1858.

"I have examined the four wet gas-meters indicated under the letters T, V, W, "and X, in the report addressed to the gas committee of the council of the city of "Manchester, by Mr. William Crosley, on Jan. 15, 1858, and I hereby certify that, "without intercepting the passage of the gas through them, the three meters "marked T, V, and X may be overfilled with water to a greater extent than they "were found to have been actually filled when examined by Mr. Crosley, and that "the effect of filling them with water up to the point they will bear without affecting "the light, will be to cause them to register against the consumer to a greater extent "than stated by Mr. Crosley in his report. The meter W is apparently a lower-"spouted one than some others used in Manchester, as it will not bear overfilling "so as to register much more than about 27½ per cent. in excess of the quantity "actually consumed.

"I have also gone carefully through a series of experiments upon meters of the 3, "5, and 10 lights, of the make and construction used in Manchester, with the view "of testing the accuracy of Mr. Crosley's report as to the effect produced upon the "registering index by overfilling such meters, and I am quite satisfied that in these "respects his statements are perfectly correct, and that these meters, when overfilled "in the manner described by him, will register against the consumer in the propor-"tions given in his report.

"THOMAS G. BARLOW, Civil and Consulting Gas Engineer,
"42, Parliament Street, London."

In one of those cases the meter will not supply its proper number of lights for many consecutive days, *unless it is overcharged*, and will continue to pass gas, when overfilled, so as to register 50 to 60 per cent. against the consumer. This meter bears the date of 1839, so that it is quite possible that for eighteen or nineteen years, the consumer may have been seriously prejudiced. With regard to the twelve meters which I reported as *not* being overcharged, in several of them the water just trickled out at the run-off plug, and there is no pretext for claiming any set off against errors on the other side with regard to them; for, according to Mr. Shuttleworth's statements, they might possibly have been 2 per cent. against the consumer even at that point. In some of these cases the consumers know how to regulate their meters, and do not entrust that duty to the agents of the gas committee. The mean overfilling on the twenty-four meters is really 7·32 per cent. *plus any amount per cent. they may be regulated at, too fast, as Mr. Shuttleworth says, at the water-line;* but this very inadequately expresses the extent of the irregularities to which such meters are liable, and which is only known to the officials. Suppose a consumer, whose meter is filled to high water mark in one quarter, and is reduced to low water mark in a corresponding quarter of another year, finds a difference of 60 or 70 per cent. in his accounts for gas between the two quarters, he may naturally ask "the reason why?" The meter is taken down and tested, and pronounced to be correct *at the adjusted water-line;* the "conjuring-box," as it has been not inappropriately termed, would be sent back again to the consumer, and the mystery remains unsolved *so far as he is concerned;* and the only checks or safeguards adopted in Manchester against such practices are the "special and stringent *instructions*" given to the *inspectors* not to overfill the meters. There is no check to see that he faithfully *attends* to these instructions. No *instructions* appear to have been given *to consumers* on this subject, who Mr. Simpson accuses of cheating themselves, through ignorance of the evil which exists in their meters, but to whom no conscience-money appears to have been returned by the gas committee on that account.

The manner in which the gas committee deal with my evidence respecting the inaccuracy of their standard of measure, is eminently characteristic of their disingenuousness in attempting to bolster up what is really indefensible. They know very well that I objected to their meter-testing gasholder, and I pronounce it as I found it, up to the 18th of May, 1858, to *be a contemptible parody* of what such an apparatus should be; but instead of their openly admitting such to be the case, and that they have *since obtained* other apparatus *in lieu of it*, they now drag in Messrs. Parkinson and Co., their meter manufacturers, and get them to say something about the standard *they* adopt. My evidence related to what I saw *at the gas-office in Manchester*, and I assert that Mr. Cleminshaw informed me that the original graduated scale attached to the testing gasholder upon which the quantity of gas or air expelled could be read off, *had been replaced by one made in Manchester* some time ago, and this scale I have good grounds for asserting made the cubic foot *less* than 1728 cubic inches, and did not, therefore, agree with the impression that Mr. Shuttleworth would create, that they gave *more* than 1728 cubic inches to the foot. Moreover, I found the cycloidal arm, by which the pressure should have been equalized, and which should move without friction, rubbing against a beam, in which it had scooped out a hole; and, further, that *equality of temperature* (which is an important element in determining the bulk of air or gas) had been so entirely disregarded, that a stove which was at the time I saw it, red-hot, was fixed within about 2 feet 6 inches of the testing gasholder in one direction, and a gas-stove, at which food was cooked daily, within about 18 inches in another direction. Moreover, I was obliged to have part of the floor taken up to allow the counterpoise weights to drop to their limit, and the partition boarding taken down the whole height of the range of the weights, so as to allow of their moving freely, before I could go on with any trials. Even after these precautions were taken, I found one of King's pressure-gauges (the best and most delicate known), which I took with me, indicated the gasholder at one point of its range to be in equilibrium with the atmosphere; at another, it gave 1½ tenth of pressure; and at a third position, 1½ tenth vacuum. I would not be bound by the indications of such an apparatus, and have, consequently, taken the precaution of having had the meters which the gas committee have ordered from me for their experiments, tested by official and other independent persons, before being sent—and *whose certificates I hold.*

I annex copies of the correspondence which has passed between my firm and the gas committee since the last meeting of the council, and I beg your particular attention to the last two letters. How any persons, who can multiply 100 by the quantities which I say the different-sized meters will deliver at each revolution of the drum, can allege that I have not conveyed a "clear and "direct answer" to the inquiry made, passes my comprehension, unless it be that they themselves do not understand the subject. As well might an engineer be asked the power of a high-pressure engine without the pressure of the steam being stated, as a meter manufacturer be asked what quantity of gas a meter will pass without the pressure of the gas being defined; and in stating that the wheels of the meters referred to, would revolve at the rate of 100 revolutions per hour with less than two-tenths of an inch difference in pressure between the inlet and outlet, I submit that the information given in my reply, even *exceeds* the strict letter of the inquiry.

The last letter has, indeed, a wider meaning than at first appears, inasmuch as, tacitly, it ignores the assurance which was given at the last council meeting, and on the faith of which Mr. Councillor Rumney withdrew his amendment to the adoption of the committee's report, that gas consumers in Manchester who might wish to have our meters could do so. If it be intended to abide by this assurance, there can be no valid reason for declining to put on record a minute to that effect; and the virtual refusal of such a minute is a matter to which I beg to direct the attention of the council.

Mr. Alderman Shuttleworth asserts that "every encouragement had been "given by the gas committee to inventors to bring their projects for the im-"provement of gas-meters *under their attention;*" but I appeal to every manufacturer of gas-meters in the country (*save one*) to bear me out in the assertion that the "encouragement" has gone no further!!! Routine and red tape have *effectually stifled* every attempt to introduce admitted improvements into the Manchester gas-meters, and with the exception of an occasional order to other manufacturers, *when the favoured one has been too busy to supply the demand fast enough*, no innovation upon the practice of the last thirty years has been tolerated; indeed, I have been told by Mr. Cleminshaw, that the meter they used was found to answer their purpose so well that the committee had always decided "*to let* "*well alone.*" Whether this system is to be *perpetuated* depends upon the citizens and council, who, if they see fit, have it in their power to terminate the present dictatorship by infusing new blood into the gas committee; and though my firm may possibly derive no *immediate* benefit from a change, I shall, on its behalf, have had the satisfaction of being instrumental in breaking up a system which tends to destroy fair dealing, and which many have desired to see effected, but which none had the courage to attack in its strongest hold.

I have the honour to be, Gentlemen,
Your obedient servant,
WILLIAM CROSLEY.

103, *Southwark Bridge Road, London,*
October 4, 1858.

Gas Department, York Hotel Buildings, 53, *King Street,*
September 3, 1858.

Gentlemen,—I am instructed by the gas committee of this city to order from you one dozen 2-light gas-meters of the patent of Messrs. Crosley and Goldsmith's, as described in the advertisement in the GASLIGHT JOURNAL; and I will thank you to inform me what quantity of gas each size of such meter will pass per hour.—Your early attention will oblige, yours respectfully, THOS. PEACOCK.

Messrs. Crosley and Co., gas-meter manufacturers,
103, Southwark Bridge Road, London.

Gas-Meter Works, 103, *Southwark Bridge Road, London,*
September 4, 1858.

Sir,—In the absence of our Mr. Crosley, we beg to acknowledge the receipt of your favour of the 3rd instant, ordering twelve 2-light meters, which we will forward in the early part of next week.

We expect our Mr. Crosley here this evening, when he will reply to your inquiries by the next post.—We are, Sir, yours obediently (for Crosley and Co.),
G. WESTON.

Thos. Peacock, Esq., Gas Department, Manchester.

Gas-Meter Works, 103, *Southwark Bridge Road, London, S.E.,*
September 9, 1858.

Gentlemen,—We observe in the proceedings of your City Council on the 1st inst., as reported in the *Manchester Courier* of the 4th inst., that gas consumers in Manchester who may wish to have our meters can do so.

As similar remarks were made verbally to our Mr. Crosley at the meeting of your committee, which he had the honour of attending in December of last year, we shall esteem it a favour if you will kindly forward us a copy of a minute of your committee to that effect after your meeting to-morrow.—We are, Gentlemen, your most obedient servants, CROSLEY and Co.

Messrs. the Gas Committee, Manchester.

Gas-Meter Works, 103, *Southwark Bridge Road, London,*
September 23, 1858.

Dear Sir,—We beg to inform you that the twelve 2-light meters ordered by you are ready for delivery, but to avoid all future questions as to the accuracy of their registration, we have thought it advisable to submit them to the examination of the public meter inspector of the South London District, and they shall be forwarded to you as soon as his other engagements will admit of his testing and returning them to us.

With regard to the questions you put to us relative to the quantity of gas these meters will deliver, we have to reply, that it will depend upon the pressure at which the gas is supplied and the number of lights in use.

The measuring-wheels of our meters are of the same dimensions as those in the meters generally in use in Manchester, and those for two lights are made to deliver one twelfth part of a cubic foot of gas at each revolution.

The speed usually recommended by meter-makers is 100 (one hundred) revolutions of the wheel per hour, at which rate these meters may be driven with less than two-tenths of an inch difference of pressure between the inlet and outlet, but by the application of a greater pressure they may be driven at a considerably higher speed, and will, consequently, in such case, pass a greater quantity of gas.

We beg to remind you that we have not been favoured with any reply to our letter of the 9th inst., wherein we apply to your committee for a copy of a minute to the effect therein stated; and as we believe the gas committee will meet again to-morrow, we request you will be so good as to bring the matter before them and favour us with an answer.

In case your question applies to the general list of consumers' meters, we beg to say that the capacities of the wheels are—

2-light	1-12th	of a cubic foot.
3 ,,	1-8th	,, ,,
5 ,,	1-4th	,, ,,
10 ,,	1-half	,, ,,
20 ,,	1·	cubic foot.
30 ,,	1·515151	cubic feet.
45 ,,	2·	,,
50 ,,	2·5	,,
60 ,,	3·0303	,,
80-light	4·	cubic feet.
100 ,,	5·	,,
150 ,,	7·143	,, nearly.

Also another

150 ,,	7·6923	,,

with different number of teeth in counting apparatus to correspond.

We are, Sir, yours most obediently,
CROSLEY and Co.

Thos. Peacock, Esq.,
Gas Committee, Manchester.

Gas Department, York Hotel Buildings, 53, King Street, Sept. 24, 1858.

Gentlemen,—I have to acknowledge the receipt of your letter of yesterday's date, which I laid before the gas committee this morning.

I was then instructed to inform you that your letter does not convey a clear and direct answer to my inquiry as to "what quantity of gas each size of the patent meter, as advertised, will pass per hour;" and, in the absence of such direct reply, the committee decline any further correspondence.—I am, Gentlemen, your obedient servant,
THOMAS PEACOCK.

Messrs. Wm. Crosley and Co., Gas-Meter Works,
103, Southwark Bridge Road, London.

Price Current.

CASTINGS, PER TON.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	4 10 0	2 14 0	3 0 0	4 0 0	4 5 0
1¼ and 2 inches Socket-Pipes	7 15 0	7 0 0	7 5 0	7 10 0	7 5 0
2½ and 3 ,, ,,	7 5 0	6 15 0	7 0 0	7 5 0	7 0 0
4 and 5 ,, ,,	7 5 0	6 10 0	6 15 0	7 0 0	6 15 0
6 in. and upwards ,,	7 0 0	6 5 0	6 5 0	6 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 15 0	...	6 15 0	7 0 0	6 15 0
,, 2nd ,, cold ,,	7 15 0	...	7 0 0	7 5 0	7 0 0
Tank Plates, ¼ thick and above	7 5 0	6 10 0	6 15 0	7 0 0	6 15 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
,, ,, ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
,, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Syphons, 2 quart	1 0	0 8	0 7	0 5	0 4	0 3
	15 0	14 0	13 6	13 0	12 0	—

COALS, PER TON.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 3d.	Boghead, at Leith	32s. 0d.
Medomsley, Eighton Moor, and Burnhope	6 6	Kirkness, best	23 0
Pelaw	6 9	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 0	,, 2nd ,,	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	,, ,, Leith	27 6
		Arniston	22 0
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	15 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	60s. 0d.	
,, ,, ,, clay	per ton	12 0	
Cliff's Fire-bricks, at Wortley	per 1000	57 6	
Ingham's Fire-bricks, at Wortley	,,	55 0	
Tough Cake Copper ... per ton	£98 0s.	Foreign Spelter ... per ton	£23 10s.
English Pig Lead ... ,,	21 10	English Block Tin ... ,,	118 0
Welch Bar Iron, in London ,,	7 0	Banca ... ,,	115 10
Tarred Rope Yarn	per cwt.	26s. 0d.	

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester	5s. 3d. to 5s. 6d.	Boulogne & Calais	£7 to £7 5s.
Cork	8 0	Barcelona	21 10
Dover	5 6	Bordeaux	£12 10s. to 13 0
Dublin	8 0	Cadiz	15 0
Exeter Quay	8 0	Copenhagen	7 10
Folkestone	5 6	Dieppe	£7. 15s. to 7 17 6
Hastings	—	Genoa	20 10
London	5s. 6d. to 5 9	Hamburg	8 0
Lowestoft & Yarmouth	4 3	Havre	8 12 6
Lynn	4 9	Leghorn	19 0
Portsmouth	6 6	Lisbon	14 0
Plymouth	7 3	Rotterdam	£7 to 7 10
Whitstable	—	Stettin	9 0
Weymouth	—	Trieste & Venice	£20 to 23 0

Advertisements.

A GAS ENGINEER, having just returned to this country from fulfilling an Engagement abroad, wishes for further EMPLOYMENT, either at home or Abroad, in Erecting or Managing Works.

He has a perfect knowledge of his Profession, and can produce Testimonials from the most eminent Engineers. Speaks French.

Address W. T., the Office of this JOURNAL.

R. LAIDLAW and SON, Gas ENGINEERS,

Iron and Brass-founders, and Manufacturers of Cast-Iron Retorts, Condensers, Exhausters with Engines, Scrubbers, Purifiers, Station-Meters, Cast-Iron Tanks, Gasometers, Valves, Cast-Iron Pipes, &c.

Consumers' Meters, both wet and dry, of improved construction.

Internal Gas-Fittings of every description.

ALLIANCE FOUNDRY,
EAST MILTON STREET, GLASGOW.

LONDON OFFICE:
162, STRAND, NEAR SOMERSET HOUSE.

TO THE GAS COMPANIES
OF GREAT BRITAIN AND THE CONTINENT.

CANNEL AND COAL FOR GAS PURPOSES.—Fifteen years' connexion with one of the largest Gas Concerns in England, enables us from practical experience to certify that the CANNEL and COAL we offer are those best suited for Gas purposes.

On application, we shall have much pleasure in forwarding our Tabulated Statements of Analyses, with Prices and Terms; also References as to respectability.

All Contract Orders have our careful and best attention.

EMANUEL TURNER and Co., Exporters of Cannel and Coal, 34, Castle Street, LIVERPOOL.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

GAS-WORKS ERECTED, ALTERED, VALUED, OR LEASED, BY

GEORGE WALCOTT, Gas and CONSULTING ENGINEER,
BEAUMARIS GAS-WORKS, ANGLESEA,
who has erected twenty Gas-Works during the last four years, all of which are giving satisfaction.
London Office, 24, Abchurch Lane, CITY.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

EIGHTON MOOR GAS COALS.—Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

RICHARDSON and CO.,
ENGINEERS AND IRONFOUNDERS,
TUNNEL FOUNDRY AND SPRING GARDEN IRON-WORKS,
DUDLEY, near BIRMINGHAM,
Manufacturers of Gas and Water Apparatus, Steam-Engine Boilers, Single and Double Gasholders, Tanks, Bridges, Boats, Roofs, Valves, &c.

MR. WILLIAM RICHARDSON,
Consulting Engineer and Contractor,
DUDLEY, near BIRMINGHAM.

NOW READY,

VOL. VI. of the JOURNAL of GAS LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1857, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., and V. are still on sale.

W. B. KING, 11, Bolt Court, Fleet Street.

JOHN ROGERSON and CO.,
NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

M. SHEEN, Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET,
MANCHESTER,
Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

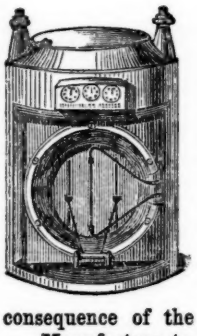
By Her Majesty's Royal Letters Patent.

JAMES MEACOCK,

PATENT DRY and IMPROVED WET GAS-METER WORKS,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.



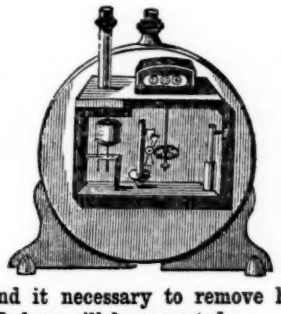
J. MEACOCK begs to call attention to his patent method of securing the Leather diaphragm of his Dry Meter. Instead of using the soldering iron for this purpose, it is held between two flat Metal Rings, and screwed up sound to a metal frame, as shown in the drawing.

By this improvement the perishing effect of hot tools to leather being avoided, its durability must be longer; also, its repair when needful is most simple, as a new leather diaphragm can be applied by merely unscrewing the old one from the rim or frame to which it had been screwed up.

Meters of Gas Companies being subject to so much wear and tear, J. M. begs leave to assure those who may honour him with their commands, that nothing but the stoutest materials for cases, the hardest gas-resisting metals, and best foreign leather for the interiors, will be used, and none but first-class workmen employed in their construction.

Wet Gas-Meters Repaired and Reconstructed with J. Meacock's Modern Improvements.

METERS SENT ON APPROVAL.



In consequence of the great demand for the above Meters, J. Meacock has found it necessary to remove his Manufactory to more extensive Premises, 16, West Street, Smithfield, where Orders will be executed on the shortest notice.

WILLIAM RYDER, General MINERAL AND METAL AGENT AND MERCHANT, 4, DEAN STREET, NEWCASTLE-ON-TYNE,

is prepared to supply Gas and Water Companies with Apparatus and Appliances of every description, including Cast and Wrought Iron Goods, Coals, Fire-Bricks, Retorts, &c. &c.

Any communications addressed to him as above shall have prompt attention.

THE PURIFYING-HOUSE SUPERSEDED.

MR. LAMING (Inventor of the Revivified Oxide of Iron Purification) has the satisfaction to announce that Gas may now be purified in a manner that combines unusual commercial advantages with all the possible requirements of the sanitary officer and the public. All that need be said to call attention to the new process is, that instead of the purifying-house, two vessels of small area, placed after the condenser, suffice; that these vessels never have the least communication with the atmosphere; and that neither lime, oxide, nor any other substance foreign to the gas itself is brought into contact with it. Gas engineers will perceive among the advantages thus offered, economy in room, labour, and materials; impossibility of nuisance; and total absence of injury to the illuminating power.

Particulars by addressing RICHARD LAMING, 118, FENCHURCH STREET.

NAYLOR'S PATENT GLOBULAR LAMPS,

FOR PUBLIC OR PRIVATE LIGHTING,

are now Manufactured of the following Sizes and Prices, the Lamps complete:—

Size.	Number of Burners.	Consumption of Cubic Feet of Gas per Hour.	Prices delivered to Carriers.
1	1	1 to 2	10s.
2	1	2 „ 3	12s.
3	1	3 „ 5	15s.
4	2 to 4	5 „ 16	30s.
5	4 „ 10	16 „ 30	50s.

Their superiority in not Obstructing the Light, in Form and Utility, render them worthy of the patronage of all Public Companies and others.

Orders, or any further information required, will meet with immediate attention on application to—

MATTHEW NAYLOR, Radnor Street, Hulme, MANCHESTER.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES
&c. &c.

LONDON OFFICES:
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A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS,
WEDNESBURY,

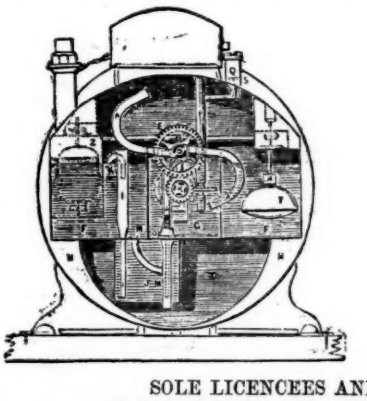
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

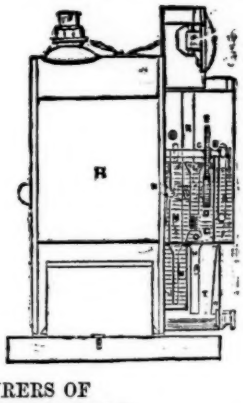
Orders promptly executed.

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON.





SOLE LICENCEES AND MANUFACTURERS OF

W. CROSLEY'S AND CROSLEY AND GOLDSMITH'S

PATENT STANDARD SELF-ADJUSTING AND COMPENSATING GAS-METERS,

By which the True Water-Line is constantly maintained, and accuracy of measurement at all times secured. SEVERAL THOUSANDS OF THEM HAVE BEEN FIXED, AND ARE NOW AT WORK, and numerous Testimonials from eminent Gas Engineers, expressive of their approbation of them, may be seen at the Manufacturers'.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENTAL METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

C. and Co. continue to manufacture ordinary WET METERS of the very best description, Mr. W. Crosley having been for many years the principal and confidential assistant of his relative, the late Mr. Samuel Crosley, of Cottage Lane, City Road, up to the time of his decease, in which capacity he communicated to W. C. the secret of the mixture of the metals which has rendered the Crosley Meter so durable and superior to all others, as is evidenced by a large number of them being still at work after having stood the test of nearly a quarter of a century's use.

By Her Majesty's Royal Letters Patent.

JOSEPH BOULTON, Patent Dry GAS-METER MANUFACTURER, and also Maker of his Improved WATER METERS.

No. 28, BAGNIGGE-WELLS ROAD, CLERKENWELL, adjoining the Police Office.—Late of No. 1, Coppice-row, LONDON.

Experimental and Station Meters of any size made to order on the shortest notice.—Governors, Pressure Registers, Gas-cooking Stoves, and every description of Gas Apparatus.

ANGLO-ROMANO GAS COMPANY. The Shareholders are informed that, in accordance with a Resolution passed at the General Half-Yearly Meeting, the DIVIDEND for the past Half Year will be payable, at the rate of 8 per cent. per annum, on and after the 1st of November next.

JAMES SHEPHERD, Gérant.

1, New Broad Street, London, Oct. 6, 1858.

TOTTENHAM & EDMONTON GAS-LIGHT and COKE COMPANY. NOTICE is hereby given that the ANNUAL GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the London Tavern, Bishopsgate Street, on WEDNESDAY, the 27th instant, at Three o'clock in the afternoon precisely, for the purpose of electing Directors and an Auditor, and for the transaction of general business.

WILLIAM BLACK, Chairman.

Edmonton, Oct. 11, 1858.

GAS-WORKS TO LET.

WANTED, by a Responsible person, the LEASE of a Gas-Work with a Rental of about £3000 or upwards per annum.

Address M. O., the Office of this JOURNAL.

WANTED, a Situation as Manager in a Provincial Gas-Work, or Foreman in a large Work, by a Young Man who thoroughly understands his business.

Address T. L., 21, Baker Street, Bristol Road, GLOUCESTER.

PADDON and FORD, Patent GAS-METER AND APPARATUS WORKS, GRAY'S-INN-ROAD, LONDON,

Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, LANTERNS, &c. &c.

Contractors for the erection or alteration of Gas-Works; and every description of Apparatus required in Gas-Works supplied.

PADDON and FORD respectfully invite the attention of Gas Companies and Managers to their PATENT STREET LAMP REGULATOR, which ensures any required consumption.

By its use a great saving is effected, and the item of "Unaccounted-for Gas" considerably decreased.

J. JONES, Iron Merchant, 6, Bankside, has long been known to sell the following Castings at prices lower than any other house in London:—Socket and Flange Pipes, Bends, Branches and Tees, Syphons, Lamp-posts, Rain-water Pipes, &c.; also, Hot Water Pipes, Elbows, Tees, Cylindrical and Saddle Boilers, and every Fitting for the same. Drawings and Prices of the above on application to J. JONES, Iron Bridge Wharf, 6, BANKSIDE, near the Southwark Iron Bridge.

J. CLIFF'S Fire Bricks, Clay RETORTS, &c.

Orders for London and South of England to be addressed to Mr. NEWTON, Agent for the District, 13, Westbourne Terrace, BARNSBURY PARK (N.).

N.B.—A few Retorts of each size, and a large stock of Bricks and Lumps, always on hand at the above Wharf.

HARRIS and PEARSON, PROPRIETORS OF BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.

MANUFACTURERS OF

FIRE BRICKS GAS RETORTS &C.

AMBLECOTE FIRE CLAY AND BRICK WORKS, STOURBRIDGE.

Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.

LESMAHAGO GAS COAL.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coalfields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas Coal, that he is prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

Shipping Agent for Glasgow:
MR. ALEXANDER STRATTON,
159, WEST GEORGE STREET.

BENJAMIN GIBBONS, Jun., DEEPDALE FIRE-CLAY & BRICK WORKS, **Near DUDLEY,**

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS, TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

GEORGE ANDERSON, Gas and CONSULTING ENGINEER, 104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS, supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES, one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS, designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

By Royal Letters Patent.

KAY'S Patent Equitable Gas-Meter is the most effective preventive of fraud by "tilting," and is as simple in construction as the common meter.

Manufactured only by
W. COWAN,
60, BUCCLEUCH STREET,
EDINBURGH.

CEMENT.

G. and T. EARLE, Hull, beg to draw the attention of Gas and Water Companies, Engineers, and Contractors, to their Light Cement, for Stuccoing and Building Gasholder Tanks, and Jointing Iron Pipes, for which purposes it will be found a very superior article.

BRYAN DONKIN and CO.'s improved GAS VALVES have been adopted by numerous Gas Companies in England and abroad, and their advantages and great security fully proved. Very large numbers are in use. Prices from 11s. 6d. to 13s. 6d. per inch diameter.

BRYAN DONKIN and Co.,
Engineers, near Grange Road, BERMONDSEY.

GEORGE CUTLER, Gasholder MAKER,
No. 8, WENLOCK-ROAD, CITY-ROAD, LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

ALFRED PENNY, Engineer, WENLOCK IRON WORKS, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY begs to inform Gas and Water Companies that he undertakes the erection of new, or the alteration of existing, works; and that he may be consulted generally on all matters connected with gas and water supply. He is also prepared to supply best Cold-blast Retorts, Socket-Pipes, and Connections, Iron Borings, &c. &c., and all the necessary Castings used in Gas and Water-Works.

*** Country orders executed with care and despatch.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c. UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

TO GAS COMPANIES.

J. W. GRAZEBROOK, 75, Old BROAD STREET, LONDON,

Having applications for New and Second-hand Gas Apparatus, would be obliged by those Companies having Apparatus to dispose of, to send particulars. And Companies requiring Apparatus are solicited to apply.

PIPES, RETORTS, TANKS, GASHOLDERS, &c. on Shortest Notice.

STOURBRIDGE and NEWCASTLE FIRE GOODS, CONTRACTS TAKEN.

FIRE-CLAY RETORTS.

JOHN SWARBRICK,

MANUFACTURER OF PATENT COMPOSITION CLAY RETORTS,

FIRE BRICKS OF EVERY DESCRIPTION, SHAPE, AND SIZE, &c. &c.

HIGHER EANAM, BLACKBURN, LANCASHIRE.

These RETORTS are generally used in the Gas-works of Preston, Accrington, Bury, Heywood, Middleton, Rochdale, Ratcliffe; the Mills of Messrs. Horrocks, Miller, and Co., Preston, &c. &c., and are unequalled in having afforded general satisfaction to those who have given these Retorts a trial.

To meet the increasing demand, the Works at Little Harwood have been greatly enlarged; and Gas Engineers who may favour with an Order may rely with confidence on their being promptly supplied with an article not to be surpassed in finish or durability.

PRICES MODERATE.

TO GAS COMPANIES, GAS PROPRIETORS, AND GAS ENGINEERS.

JOHN VICKARY

begs to call the attention of the above to his improved METALLIC CASE GAS-METER, an improvement which has met with entire approbation from the various Gas Companies and Engineers to whom he has introduced it, and acknowledged to be the greatest improvement that has been made since the year 1832; at which period a metal was introduced for the construction of the Drum, Syphon, and Float, capable of resisting any impurities arising from either gas or water, which has been found to answer every expectation; as, in repair, Drums of the above date are found in perfect and good condition, when the Outer Case, Valve-box, Inlet-pipe, &c., are quite destroyed and entirely past repair.

J. V. has introduced a coating or lining of the above metal in the Outer Case, Valve-box, Inlet-pipe, &c., thereby rendering the whole as durable as the Drum, as not a particle of tin plate is exposed to the action of either water or gas; and preventing the possibility of gas passing above the water line through the front into the body of the Case to the outlet unregistered, which frequently occurs. When the Meter has been in use for any length of time it is generally found that rust or decay takes place *above* rather than under the water line, which is only discovered when they need repair. Also the Inlet-pipe and Valve-box are generally found quite decayed, which cannot happen in the above improvement.

J. V. feels confident that the above will be found a most desirable and perfect instrument, as it contains all other improvements of utility that have been introduced up to the present time.

The most strict attention is given to the workmanship as well as the registration of every Meter, to render them perfectly accurate.

Station Meters, Governors, &c., made on the shortest notice, as well as Gas Cooking Apparatus of every description, Gas Baths, &c.

Meters sent at the lowest London prices.

Carriage paid to any part of England.

WEST OF ENGLAND GAS METER AND GENERAL GAS APPARATUS MANUFACTORY, 84, FORE STREET, EXETER.

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

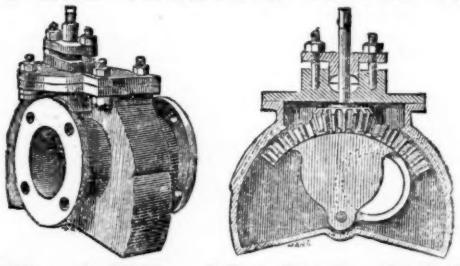
THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M. B. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

WILLIAM PARKINSON AND CO.,

(Successors to the late Samuel Crosley,)

COTTAGE LANE, CITY ROAD, LONDON,

Beg to announce that, in addition to the manufacture of GAS-METERS, they continue the manufacture of METERS for MEASURING WATER, SPIRITS, &c., commenced, under Patent in 1849, by the late Mr. William Parkinson.

These Meters are as simple and durable as the Gas-Meter, and as correct as that instrument in the registration of the fluids passing through them.

JOHN BENT, Manufacturer of GAS-METERS,

283, BELL BARN ROAD, BIRMINGHAM, (Established 1830),

Begs respectfully to call the attention of Gas Companies, Engineers, &c., to his WET GAS METER, made upon the most improved principles, the most admirable materials, and warranted to register correctly.

"ALL DOUBTS REMOVED."

DEFRIES' celebrated Dry Gas-METERS, of which there are 80,000 in use in Palaces, Churches, Chapels, Royal Dock-yards, Club Houses, Public Offices, and other buildings throughout the Empire, the Continent, and Colonies.

His meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that building was destroyed by fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company and found inflexibly correct.

On the 9th of June, 1858, at the Western Gas Company, his meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests, from the full lighting down to a single jet, and in each case, as in numerous other instances, accuracy was finely indicated.

His two large meters at the Thames Tunnel have been in constant use day and night for upwards of twelve years (one continuation of dark hours), subjected to the wear and tear of 75 years, as compared with the ordinary hours of using gaslight above ground.

Gas Companies honouring Mr. Defries with their commands for his PATENT DRY METER, which has done so much service in simplifying the fitting up of gas, as well as checking surreptitious burning, will be guaranteed perfection for five years free of charge.

Defries' Prize-Medal Gas Baths, Gas-Cooking and Heating Stoves. The Polytechnic Gas Fire, with indestructible fuel, in daily operation (Saturday excepted) at the Office, 145, REGENT STREET, and the Manufactory, Euston Road, Fitzroy Square, LONDON.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

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THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

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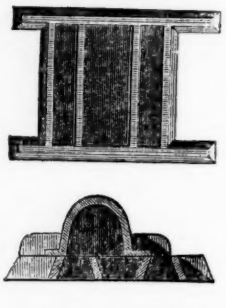

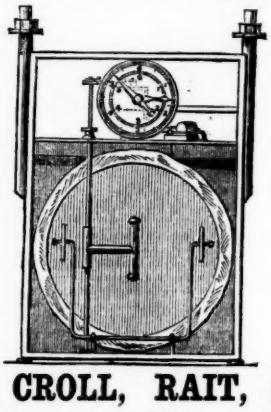

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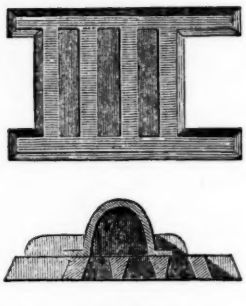

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These Improvements remove at onee any liability to unsteadiness of light, and at the same time secure (from the Valve working more evenly) a greater certainty of accurate registration.

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